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FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 27. JULY 2, 1932. VOL. 12.

OBSERVATIONS ON CANINE DISTEMPER PROPHYLAXIS*

T. DALLING, M.R.C.V.S.

I am afraid there is little new to tell you in connection with canine distemper prophylaxis. It has only been because of the insistence of our irresistible Hon. Secretary that I have consented to come and again inflict upon you a discussion on this subject. It is true that we have had twelve months' further experience with the various methods of immunisation and the use of the respective products since I had the honour of last addressing you. It may interest you, therefore, to know of our own experiences at the laboratory and those of veterinary surgeons who have been kind enough to keep in touch with us.

COMPARATIVE VALUES OF METHODS OF IMMUNISATION

Some of you will doubtless have read the article we published in the *Veterinary Journal* in December, 1931, in which we pointed out that: "vaccine followed by dry virus is at least 99 per cent. efficient as an immunisation method for canine distemper." This statement was based on results of the use of these materials on foxhounds in many kennels throughout the country. We have received no information following the use of vaccine and dry virus which would cause us to withdraw that statement. The same good results are still being experienced when this method is employed, not only among foxhounds, but among all breeds of dogs all over the country. During the past year several thousand dogs have been immunised by this method and, as far as our records go, in only one or two cases—certainly under half-a-dozen—has there been any suggestion that the method has failed to produce lasting immunity. Even in the cases mentioned no definite proof was forthcoming. Occasionally, reports have been received that dogs have reacted severely after the dose of vaccine was given (no virus injected). Reports have been received since the beginning of the year embracing roughly thirty dogs, the majority of which subsequently recovered. Investigation of these cases convinces me more than ever of the great necessity of ascertaining that the dogs are free from distemper or any other disease at the time of inoculation and are not exposed to any infection for at least the first week following their treatment. During the experimental use of vaccine and virus produced by ourselves the greatest care was taken by the users of vaccine to carry out the instructions which we elaborated on the lines laid down by Major Dunkin. I feel that as the method becomes more widely adopted veterinary surgeons are apt to neglect some of the essential precautions and so run risks which may terminate disastrously.

Many veterinary surgeons have made use of the serum-virus simultaneous method of immunisation. This method is so convenient to the dog owner (because of shorter quarantine) and to the veterinary surgeon (because it calls for one visit instead of two) that we all hoped deeply that it would be as successful as the use of vaccine and virus, but unfortunately it has not proved so. There is something about the method which we do not yet fully understand. It is probably true to say that if we count every report of reactions of any kind seen after the use of serum-virus and failure to produce the lasting immunity as being to the discredit of the serum-virus method, the total percentage of these failures is not higher than that mentioned in certain statistics in connection with the use of serum-simultaneous methods employed against rinderpest and hog cholera. Various figures are quoted for the percentage of failures in these methods, varying from one to five per cent. or higher, and people make allowances for them, but in immunisation of dogs a five per cent. failure would cause consternation and, moreover, every failure rebounds to the discredit of the Laidlaw-Dunkin first method of vaccine-virus method of immunisation. When this method was first introduced we issued a warning to veterinary surgeons desirous of using serum-virus. We would emphasise that warning to-night, for the amount of irritation caused to the dog owner, and veterinary surgeon, and the amount of troublesome correspondence, visits to packs, etc., which are imposed upon our staff are, in our opinion, too great a price to pay for the use of this method in its present form.

We know that some veterinary surgeons have experienced no bad results whatever from this method and will continue to make use of it. Our duty ends when we have made properly tested serum and virus for use in the method. If a veterinary surgeon or dog owner wishes to employ it he must do so with a full sense of responsibility. For our part we cannot help saying that we would be much happier if the

*Paper presented to the Central Division, N.V.M.A., at 10, Red Lion Square, London, W.C.1, on June 2nd, 1932.

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general issue of the material for the serum-virus method were entirely withdrawn until further research may throw some light on the failures. In going through our laboratory records we find we have had about five per cent. of failures in the use of serum with dried virus and three per cent. in the use of serum-wet emulsion of virus. The percentage of " complaints "—accepting for the moment all as being well-founded—after the use of serum and virus has been 20 times as high as after the use of vaccine and virus.

DRIED VIRUS

You will remember that when I spoke to you last year I referred to the stability of dried virus. We have carried out lengthy experiments since that time and, with few exceptions, have shown that virus dried—prepared as already detailed in a previous article—can be kept under ordinary conditions for some weeks at ordinary temperatures without appreciably losing much of its potency. We have despatched many samples to remote parts of the world and have had them returned to us for testing. In practically all cases the virus content of these returned samples has been high. The most careful supervision is required all the time to ensure that the dried virus is of adequate potency. We carry out full tests for this purpose, including the testing of the virus up to the last possible moment before it is used in the field and again after the last date on which the batch could have been used in the field. Given a virus of potency up to the standard we have set, used in conjunction with vaccine, a high degree of lasting immunity is practically certain. Some veterinary surgeons have experienced difficulty in preparing an emulsion of dried virus in the saline solution. We have shown that batches differ considerably in their rate of entering into a suspension; with some, considerable mixing is required. We feel that in some cases the full amount of virus may not have been injected and we think that possibly this may account for some of the reported bad results with serum-virus immunisation for, though a smaller amount of virus seems to give adequate protection when used following vaccine, with serum a full dose of potent virus may be necessary. We are at present trying a means of improvement of the virus and fluid for suspending the virus more readily; so far the results are highly promising.

HYPERIMMUNE SERUM

We have found in our experimental work that the value of ordinary hyperimmune serum lies in its prophylactic rather than its therapeutic use. We have many records of its value in preventing illness in dogs in contact with distemper cases. The results of its use in the treatment of distemper are varied. We know from experiment that if given in sufficient quantity and sufficiently early in the course of a true distemper infection, the course of the disease may be considerably shortened. The potency of various batches of sera will naturally vary, although all may conform to a minimum standard. I am beginning to feel that hyperimmune serum is of value only if given in large doses—up to 50 c.c. may be necessary as a first injection. The first injection would seem to be important. There are records of a dose of, say, 10-20 c.c. given early in the course of the disease producing an immediate beneficial result to be followed in the course of a few days by a recurrence of symptoms. It would appear that the small amount given at the first injection " knocked out " much of the virus but left some either unharmed or only temporarily modified in its pathogenicity. A larger initial dose may have completed the destruction of all the virus. When the disease has run a course of a day or two and the symptoms due to the usual secondary invaders have become evident, there may be little good effect accruing from the use of serum, and no matter of what high degree of potency a serum may be, too much must not be expected from its use under such conditions.

Hyperimmune Serum Concentrated Antibody prepared by Laidlaw and Dunkin, the value of which was described by Professor Wright in the *Veterinary Record* on April 16th, is the latest development in connection with hyperimmune serum. We have also prepared such concentrated antibody, but the difficulty experienced in the past of keeping up supplies of ordinary hyperimmune serum on a large scale has precluded us from producing any but small experimental volumes of concentrated antibody. Now that both Laidlaw and Dunkin and we ourselves have shown that hyperimmune serum can be prepared in horses the prospect of preparing concentrated antibody in greater bulk is decidedly good.

VIRUS DISTEMPER IN ANIMALS OTHER THAN DOGS.

It appears to be definitely established now that the distemper of the cat is caused by a virus other than that of canine distemper and that the dog and cat are non-susceptible to the respective viruses. As far as experiments and experiences are concerned, true canine distemper appears to be confined to dogs, ferrets, fitch and animals of allied species, especially the fox and mink. We showed that the findings of Laidlaw and Dunkin in connection with the susceptibility of the ferret and its immunisation against distemper are equally applicable to the fitch. Vaccine made from infected ferret spleens protects the fitch against a subsequent dose of ferret, dog or fitch virus, and fitch so treated

resist natural infection. We have also shown that the silver fox is susceptible to canine distemper virus and can be immunised by the use of vaccine, serum and virus of dog origin. We are in the midst of a research into the most suitable methods of immunising foxes bred in captivity against distemper for we realise that, though up to the present true virus distemper has not been recorded in such foxes in this country, it will only be a matter of time till the disease makes its appearance here as it has done in Canada, with such disastrous results.

I feel I have told you little new and would ask you to regard these remarks simply as an opening to a discussion which I hope will deal with experiences of individual veterinary surgeons. It is only from your observations that a true idea as to the value of the various methods of immunisation can be arrived at.

Discussion

Mr. F. H. Stainton, in opening the discussion, said: I am sure we all wish to express our appreciation to Major Dalling for his observations on distemper, brought up to date.

He makes some apology in that he has little new to tell us. As a matter of fact, I think you will agree that he has given us a short paper packed with food for discussion—which is far more useful than a lengthy technical paper, leaving little time for us to discuss the matters which concern the practitioner.

The value of this paper lies in the fact that it crystallises some very important points which give scope for enquiry this evening. Its object, as Major Dalling points out, is to stimulate an exchange of experiences between individual veterinary surgeons. I suppose these experiences will fall roughly into three classes:—

(1) The treatment of individual cases and ordinary hospital routine.

(2) Greyhounds in mass.

(3) Packs of hounds.

The first important point is that of the comparative values of vaccine + virus and serum-virus methods.

Some of us, to our sorrow, remember some disasters with vaccine + virus. At the time, a prejudice was established in the minds of many breeders, which has not yet been overcome. I think it was at this time that the serum-virus method was evolved. I for one adopted that method and have, more or less, adhered to it ever since. On the whole, results have been satisfactory. There have been failures—but the percentage of break-downs has been so low that I have not questioned the method as much as the conditions.

After all, nothing on this earth can register 100 per cent. efficiency—unless it is "April 5th." I know that Major Dalling has upheld the vaccine method throughout and he states definitely to-night that it is the only reliable one and that the serum method does not stand the test of time.

That is a matter of importance, which I would like to see settled to-night and perhaps Major Dalling will give us more information and detail on the point.

As regards serum and virus—I may be wrong, but I have been under the impression that Major Dunkin assured me that a puppy could be immunised by this method and *immediately* exposed to chance of infection. That appeared to be a safeguard for young dogs admitted to hospital for a lengthy stay, as for the treatment of mange, etc. I know, by experience, that it is not a reliable safeguard—although the break-down may occur some months afterwards. This, of course, may support Major Dalling's contention that the serum + virus does not stand the test of time—or be open to some other explanation. Incidental to that query, I would like to include two others:—

(1) Would it be preferable to use serum alone as a protective agent in these cases?

(2) What procedure should be adopted when the client asks that the puppy shall be also immunised while in hospital for mange?

As regards the virus—I am sure that we are all rejoiced to learn that Major Dalling has discovered a more efficient diluent. Under present conditions, it is almost impossible to suspend the whole dry virus in solution: it sticks to the walls of the ampoule, and if an accurate dose is represented the chances are that the subject rarely receives it. It is a point of satisfaction, however, to note that the period of stability has been extended to such a degree.

Next comes the point of care and technique in inoculation by whatever method. Major Dalling hints that some veterinary surgeons may welcome an easy method of inoculation and neglect some of the essential precautions.

I will quote one example to show where it may be difficult to follow out the scheduled precautions.

A prospective client 'phones up as follows:—"I have bought a dog and am sailing for America in two days time. I would have you inoculate him." Do I refuse to inoculate on the grounds that: (1) I cannot take the temperature a week ago or a week hence; (2) The dog has come from a dog shop? Which do I risk—my conscience or the day-book?

The next statement in this paper is that immunity is only acquired at least one week after inoculation. This is definite and helpful from the practitioner's point of view; on the other hand, it involves my previous query *re* immunising a young dog in hospital—and Major Dunkin's assurance that protection is immediate. The next consideration is that of hyperimmune serum or antibody. At a previous meeting, I expressed my confidence in this as a curative in the early stages. I am still confident, but agree with Dalling that large doses are essential. I proved this by attempting economy. In view of the scarcity of the material, I tried dividing one dose between two cases, which resulted in two failures instead of one possible success. Now that it has been possible to immunise a horse—a matter for congratulation—possibly we may look for larger supplies, but even then, I presume the cost of production will be high. Finally, it is proved scientifically that canine distemper and feline influenza (or distemper) are distinct and non-communicable. That has been known clinically for a long time. It is our custom, for instance, to house operation cats in the Canine Distemper Ward for safety.

One last point, not arising from the paper—can we arrive at a standard fee for inoculating a dog?

Thank you, Mr. President—that is all I have to say—except that I thank Major Dalling, again, for his paper.

The President (Major Hamilton Kirk) observed that they had listened to a very interesting paper and a very interesting opening of the discussion. The paper was now open for general discussion, which seemed to him likely to be of a very lively nature.

Major G. W. Dunkin said that, actually, he came to learn that evening, and so far he had not been disappointed. He had enjoyed Major Dalling's paper immensely and it was not untrue to say that he had learned quite a lot. He could not add much to what Major Dalling had said, but at the same time they would understand him when he told them that he was deeply sorry to hear of the decision which had been arrived at by the scientists at the Wellcome Laboratories at Langley Court, that because of the results which they had obtained from its issue in the field, they would no longer issue serum and virus, except by special request. Nevertheless, he felt disposed to agree with that view if that was their only reason.

It was difficult to suggest, as Major Dalling had already said, why there should be that difference in results between two methods when, as the essayist had already pointed out, the results obtained by a method similar to that in such conditions as hog cholera were uniformly good. Their own experience in the laboratory, and of the cases they had been privileged to carry out in the field, were quite good and Major Dalling's laboratory experiments were, he believed, equally satisfactory. At the same time one must not forget that there was a good deal of difference between the experimental production of a biological product such as hyperimmune serum and living virus and its commercial production for distribution over long distances in the field. He maintained that probably some such explanation might be the cause of some of the cases cited. On the other hand, although he was a strong believer in dried virus (and it was certain that durable immunity could not be obtained without its use) he sometimes wondered whether there was something curious, something odd, about the virus of distemper after it was dried. The fact remained that, in so far as he personally was concerned, he proposed to go on using serum and virus when he was asked.

A great advantage of that method, he thought, was that, provided everything was carried out in the proper way, the dog was immune from the word "go." That was a good thing for the dog, a good thing for the owner, and a bad thing for the veterinary surgeon, because he only got one fee instead of two.

The other question raised by Major Dalling, of the use which could be made of hyperimmune serum, led him (Major Dunkin) to say that it was, in his opinion, important to remember that hyperimmune serum as a curative agent was quite useless unless given in large doses and in the very early stages of the disease—those stages which were not clinically recognisable: in those which were beyond that stage he was afraid hyperimmune serum would be of very little use and very expensive because very large doses would have to be given. However, there he thought the concentrated antibody would be of some assistance.

Another very interesting and important point raised by Major Dalling was the question of the susceptibility of other species of animals to the virus of dog distemper. He had the privilege, last year, of visiting Canada and some of the silver fox and other fur-bearing animal farms in that country, and he was amazed at the amount of money which was lost annually by deaths of silver foxes from distemper alone. It was a colossal sum, and as Major Dalling and Dr. O'Brien would know, the Canadian fox breeders would stop at nothing to prevent that terrible and annual loss. It was interesting in that connection to know that in at least one outbreak of distemper in a silver fox ranch in Northern Ontario it was considered by the veterinary surgeon in attendance there that hyperimmune serum, prepared from the dog, was extremely valuable in controlling the loss of foxes. He confined his injections to those foxes which were apparently quite healthy and which had shown no symptoms whatever. Dr. Law (the veterinarian in question) told him that, so far as prevention was concerned, he considered his results as being 100 per cent. successful.

He would like to add his thanks to Major Dalling for what he had told them and to express the hope that he would continue with the good work that had been carried out for so long now. Some of them, and none more than he (Major Dunkin) knew the very long hours Major Dalling had put into that work. It was not his province to hand out bouquets, but on that occasion he proposed to go out of his way to tell them of the tremendous mental strain inevitably experienced by anyone responsible for the commercial output of that very dangerous product, living virus; but he thought that all of them were perfectly happy in knowing that its distribution had so far been confined to members of the veterinary profession, from whom he hoped Messrs. Burroughs Wellcome and Co. would in future receive all possible information and help.

Mr. A. Cornish Bowden stated that it would be presumptuous for him to say anything on the scientific aspect of the question, but concerning the practical application of these products, he had used a considerable amount both of the virus and vaccine, and also some of the serum and virus. On the whole, his experience had been excellent with both, with one big exception, and that was a point about which he wished to learn something definite that evening, *viz.*, the fact that he got a large number of abscesses occurring after the use of the vaccine and some after the use of the virus.

Some ten or twelve months ago he thought he had been put wise as to the prevention of these abscesses in the massaging of the vaccines well into the tissues after injection, and indeed for a short time that method appeared to yield success, for the abscesses failed to form; but lately he had had a worse outbreak of them than ever, and some very regrettable ones: people had said to him that they sent their dogs to be immunised against distemper and did not pay that price to have abscesses occur. These broke out sometimes three and four months after injection and a further disturbing feature was the very disagreeable nature of the abscesses, from which one could evacuate some stinking, rather peculiar form of pus, followed over a long period by the oozing of a clear serum from the wound. That, in many instances, kept up for months: the dogs were perfectly well, but one got a bare patch which on some occasions grew no hair afterwards and on other occasions, especially in valuable prize dogs, grew hair of a totally different colour from that required in that species of dog; moreover, it was often of a different texture. He should like to hear the experience of other Fellows in that connection. He had absolute faith in the vaccine and virus preventing the disease but, as he had said, people grumbled at one's preventing one disease and setting up a condition which rendered their dogs sometimes absolutely useless from a show point of view.

With regard to the latter part of Mr. Stainton's opening, he (the speaker) would also very much like to know whether there was any standard price that should be charged to clients for the injection of vaccine and virus. In the very early stages of the production of these products by the Wellcome Physiological Research Laboratories he had a long talk with Major Dalling (and, he believed, Dr. O'Brien also) on the subject, and

they came to the conclusion that when animals were brought to the surgery for that operation 10s. 6d. for an injection was a reasonable price to charge. Lately he had met with many animals that had been done for a much lower price than that by some of his neighbouring practitioners, and it would be a useful thing if they could come to some agreement as to what would be a reasonable fee to charge.

Mr. J. C. Coleman said that he would first like to thank Major Dalling for the additional information he had given them that night. He was rather alarmed that Major Dalling had spoken so disparagingly of the serum and virus treatment, because he had adopted it lately with 100 per cent. success—but, of course, sufficient time had not elapsed to enable an estimate to be made of the duration of the immunisation. He had dogs at the present time that had been immunised in 1928 with the intradermal method of injecting the virus, and five of them, to his knowledge, had been exposed on many occasions to distemper infection, and up to now none of them had shown any symptoms of the disease.

Vaccine and virus he used during 1929, 1930, and 1931 (this year he was using serum and virus) and he might say that he had had 100 per cent. success. He had done between 500 and 600 dogs, varying in size from hounds to the toy breeds, with the vaccine and virus. In three cases only, he had very horrible abscesses form, with a septic discharge. However, he blamed himself for them: he thought it was the technique of administration which was at fault. He inoculated these three with about 30 other hounds and no abscesses appeared in any of the others. Since then he had used a fresh needle for every dog and had had no further trouble with abscess formation. He had a bloodhound of his own which he inoculated in 1929: it had been exposed eleven times to virulent cases of distemper, and this year it had been with three dogs suffering from the disease, one of which had septic double pneumonia, and died, one had the nervous form, and the other the ordinary catarrhal form very badly. That bloodhound had never ailed in any way.

No-one had remarked about the age at which animals should be inoculated. At first it was recommended that the inoculation should be made at the eighth or ninth week; now he believed it was recommended to do them at twelve weeks, but he still did them at nine weeks for the reason that he thought that the risk of infection was much reduced if the injection was made as soon as possible after the puppies were weaned. In all the cases he had had, he had always kept them a week before he had attempted to immunise them; he thought that that was the reason of his success.

From his experience he quite agreed with Major Dalling that one must give a large dose of serum, and that very early after exposure to infection, if one wished to cure distemper. He had followed that up by five injections, every other day, of 10 c.c., with fair success. Distemper had followed in some cases, but it had been of a very much milder type than would have been the case without treatment, and the dogs had all recovered. Dalling said that the dogs must not be exposed to infection for a week: he (Mr. Coleman) thought it would be a good thing if one could keep them from being exposed to infection for a week before they were inoculated.

He had just had a very virulent outbreak of distemper in a bloodhound kennel. A strange complication occurred there—every bloodhound had pneumonia. He had Major Dalling down, and the latter, while expressing the view that he (Mr. Coleman) had done all that he could, said that he would let him have some human material. Accordingly, he let him have some pneumonia streptococcus for the pneumonia and some gas gangrene serum for one which had developed septic pneumonia. He was pleased to say that the five cases of pneumonia to which he gave the human serum had all recovered but one. To the animal that had the septic pneumonia, Dalling advised one injection of 1 c.c. of the gas gangrene product, and two hours afterwards to give the remainder in the ampoule (9 c.c.) if no reaction was shown, and on the following two days he gave 10 c.c. On his second visit the horrible smell was much decreased and on the third visit it had disappeared entirely. The dog was recovering fast at the end of ten days, but the owner came down and put the hound out on the lawn. As a consequence, he had another bad attack of pneumonia, fits followed, and death ensued in 24 hours. It was interesting to know that the gas gangrene serum had the effect of checking the septic pneumonia.

Mr. R. A. Willett expressed his gratitude to Major Dalling for giving them the chance of airing their views and possibly their grievances. He was afraid, from what the essayist had said, that he was now rather like a ship with a dragging anchor, because he had pinned his faith to the serum virus method, and he thought they had done very well with it. The one thing that had caused a little worry with that was that—admittedly in one breed only (Shetland Collies)—he had had four animals that had been immunised by the serum virus method, and these dogs, from being in perfect condition when attended, had become wasters. These were not in one batch—the cases occurred at different times, but the last one was now three months since the vaccination; and the first about nine months. They looked like animals suffering from Johne's disease—(laughter)—but showed no other symptoms.

With regard to the use of serum, ever since he first used it he had kept a certain quantity by him in case any valuable puppies came in, in which event he always gave 10 c.c. serum, and he had always had very good results. So far as the serum as a curative agent was concerned, if one got the animal early enough it was, as they all knew, useful; but he had had one or two weird experiences in connection therewith: one of these he would like to quote. A very useful-looking Airedale puppy was brought to him, at the age of four months, with some terrible puppy teeth, and the history that he had had a screaming fit. The owner was not satisfied with his merely looking at the teeth and so forth, being persuaded that the dog had distemper. He (Mr. Willett) personally did not think so, but he gave it 10 c.c. serum straight away. That dog, after his puppy teeth were all removed, picked up well. At the end of the first fortnight he gave him another 10 c.c. serum, and they heard no more of him until five weeks after the second injection when the dog went down with typical distemper fits. He had not been in contact with any distemper case, and he wondered if the dog had a latent infection (probably in the spinal fluid) from the first fit, or if it was a fresh infection, in spite of the fact of his having had two injections of serum over a period.

Mr. Coleman had raised the question of the age at which to vaccinate. Personally, he was inclined to disagree with him: he liked, if possible, to vaccinate dogs at the age of three months. One reason why he differed from him was this: he thought that when one weaned puppies one was putting them on a heavy diet from a fluid one, and that possibly lowered their vitality; at 12 weeks they were absolutely settled in that way

and they had not started their teething troubles: one had three weeks before they started those and by that time vaccination would be complete.

He was pleased that the question of the fee had been raised because the invariable question was "What are you going to charge?" Personally, he always charged a guinea, and he thought it extremely reasonable at the price.

Professor G. H. Wooldridge observed that he had had considerable experience of both of those methods of vaccination and he was pleased to say he was very satisfied indeed with both methods, having had only one breakdown with each. With the vaccine-virus method the breakdown occurred with a retriever which, at the time of vaccination, reacted under quite normal conditions and went home happily. Three months later twitchings commenced and they developed into a progressive chorea. That dog, unfortunately, had to be destroyed.

With regard to the use of the vaccine-virus method, he did not like it as well as the serum-virus method, for two reasons. The first reason was the period that had to elapse between the use of the vaccine and that of the virus, during which, of course, there was a possibility of infection before the first vaccine immunity was developed. That period did not occur at all when an effective serum was used because passive immunity was established right away. The second reason was one that had been referred to by other speakers and that was the possibility of abscess formation at the site of inoculation. He was not going to accuse any of the members who had had that experience of being guilty of faulty technique in all those cases; he was perfectly certain that the occurrence of abscesses in some cases was due to the idiosyncrasy of the dog itself, and was a local reaction to protein breakdown products. He was driven in the first instance to that conclusion by an experience he had with a terrier puppy of three months old, which, on injection of the vaccine, developed an abscess. He waited until the abscess had cleared up and as he did not know to what extent immunity might have been established in the presence of an abscess, he decided to vaccinate again, not feeling justified in giving the virus. On that occasion he took extra precautions, if possible, against any faulty technique yet, curiously enough, the dog developed an abscess again under precisely similar conditions when injected at another site. The presence of an abscess of that kind was a source of great worry and anxiety not only to oneself but also to the owner, and if it were possible to avoid that it was well worth while.

The one breakdown in the use of serum and virus, to which he had referred, was with serum and dried virus, in a Sealyham puppy vaccinated in November last. He went through a normal reaction to the vaccination and was apparently quite happy until the month of April this year. He was then brought along with a condition of malaise and a rise of temperature, though during the course of the attack this never rose more than to about 103°. The case, however, developed true typical distemper, with nervous complications, and in the end the dog had to be destroyed. Those were the only two breakdowns, and he was personally satisfied that those instances should not be allowed to interfere with one's duty in regarding that as a most valuable method of protection against canine distemper.

He would have liked to hear from Major Dalling that he had been able to persevere with the suggestion he put forward some time ago, which was, instead of following the vaccine with virus follow it with a second dose of vaccine, which might help to consolidate the immunity and to do away with the possibility of getting an attack of distemper following the injection of the virus. He would also like to learn how long such immunity lasted.

Then as to the use of serum as a curative agent: he felt that he had had great help from it in that connection and also from the use of concentrated antibody, but always in those cases which he had seen for the first time and which he admitted were therefore open to the accusation of not being positively diagnosed true distemper. In those instances in which the disease might not have been distemper, however, he must claim for that anti-serum some non-specific effect, and consequently he felt more than justified in using serum and antibody in the very early stages.

With regard to the cost of the inoculation; he made no bones about it—he said "this appears to be the initial stage of distemper; if it is, this serum is indicated and the probabilities are that the dog will pull through. The cost for the single injection is half-a-guinea."

In those instances obviously one would never dream of using virus.

Concerning the injection of serum into young dogs admitted to hospital, it was quite impossible for one to guarantee that adult dogs brought in would not introduce infection; therefore he always advised the inoculation of young dogs with serum or antibody, taking the precaution to tell the owners, who, of course, paid for the injection, that it was not 100 per cent. reliable. As to the cost of vaccination, they never dreamt of charging anything less than a guinea and no objection was raised.

In conclusion, he desired to say that he would like Major Dalling to give them information with regard to repeated vaccination, and that he would be sorry to be influenced in the meantime by the essayist's rather gloomy picture of the use of serum and virus which, as supplied to him, he had found most efficacious.

Dr. R. A. O'Brien said that the first aim of Major Dalling's work was to make reliable products with which they were satisfied and which they could hand over to members of the veterinary profession with a reasonable degree of confidence, and he thought that Major Dalling and his staff had done that, at least as far as vaccine, dried virus and serum were concerned.

The cost of production had been enormously heavy.

Major Dunkin had said that he regretted that a decision had been taken not to issue serum plus virus any more. Messrs. Burroughs Wellcome and Co. dealt with all business matters and he had no authority to speak for them. No final decision of the kind had yet been taken, but he knew there were two things that worried them very much. The failures with serum-virus in the laboratory had been about five per cent.; in the field they had been about the same. This figure did not seem high, but it produced much irritation. The other point was that every failure did prejudice the whole future of immunisation.

Vaccine-virus was extraordinarily successful to-day; it was almost 100 per cent. successful, and that was extremely good for any method of protection. The future of immunisation by vaccine-virus—the original method—at present was imperilled by any failures following the use of serum-virus.

Major Dunkin had said that, in giving serum-virus, the dog was immune from the word "go." He should be very grateful if Major Dunkin or Major Dalling would tell him if they had proved that experimentally—*i.e.*, if a dog, two days

after the injection of serum + virus, were given a lethal dose of fresh virus, would it escape infection, because it had already become immune?

He was sure Major Dalling would allow him to say how deeply he appreciated Major Dunkin's charming remarks about Major Dalling's work. No one was more qualified to speak on that matter than Major Dunkin, who had seen the work through from the earliest days. The unavoidable strain two years ago had not always been due to shortcomings of material.

The discussion on abscesses he thought Major Dalling would deal with, but he might say that in those curious troublesome abscesses, which were not in every case due to faulty technique, one must remember that one was injecting a foreign protein, and one might get little-understood protein reactions with local necrosis. They felt that the chance of abscesses occurring might be reduced by reducing the amount of material. One point that he was very anxious to have inquired into was the relation of fits to distemper. He knew that Major Dalling had it on his programme to investigate whether the virus could be isolated from the brains of dogs during the late fits.

If they would allow him, he would like to say, in great trepidation, a few words on the matter of the fee, though that was one purely for the veterinary profession. He wondered what the future would be. Each year seven hundred thousand puppies were born which were destined to live for several years: he was wondering if the veterinary profession of the future would work out some method of mass immunisation of these dogs. If one had a clinic at which large numbers of dogs were immunised, a veterinary surgeon might think it well worth while to do large numbers of dogs for a smaller fee than was at present reasonably charged for the amount of trouble incurred in arranging for temperatures to be taken some days in advance and the supervision of the dog after injection.

Veterinary surgeons in the North who injected sheep found it possible to charge a very low fee per sheep because they sometimes did many hundreds at one visit.

Major Dunkin, replying to Dr. O'Brien's question as to his reason for saying that a susceptible dog that was the recipient of the serum-virus method was immune from the word "go," said that his reason for that assertion was as follows. They had a serum which they believed to be very good, and they gave dogs what they believed to be a legitimate protective dose, at the same time giving them on the other side what they considered to be a relatively large dose of virus. In the first experiments they conducted on those lines nothing happened, and at the end of a week or ten days those animals were tested with large doses of virus and were found to be immune. Then they found out that hyperimmune serum, given alone, assisted in producing a resistance to distemper for a matter of nine days: therefore the beneficial effect of serum alone was very transient. He thought it fair to say that the double injection of living potent virus with good hyperimmune serum, by analogy, must of necessity create a state of affairs in that animal which rendered him resistant to any possible infection of virus he might get.

Dr. O'Brien had expressed the hope that some effort would be made by someone to investigate the nervous form of distemper. That had been in his (Major Dunkin's) mind for a long time, but these cases so rarely occurred. Nevertheless, it had occurred to him that it might be desirable to try the effect of a relatively large dose of hyperimmune serum intrathecally. They had succeeded, as they knew, in times gone by, in preparing vaccines from the brain tissue and also in infecting susceptible animals from the brain and from the central spinal fluids, but the treatment was really a big business and he was not quite sure how it could be tackled. It was a line of research which could be prosecuted by Major Dalling and his colleagues in the future.

Professor Wooldridge enquired if it were not a fact that if the serum were not able to produce immediate immunity, then the dose of virus which was given immediately afterwards would undoubtedly cause an attack of distemper in that dog? He thought that answered the question of the production of immediate immunity by hyperimmune serum infection very definitely.

Miss M. Stewart observed that when they started Major Dunkin's method of giving serum-virus inoculations she asked him how soon an inoculated dog was considered to be safe to be put in contact with a distemper case, and the reply was "immediately." Acting on that information, when she inoculated any puppies she at once put them into the distemper ward: she had dealt with a number in that way and not one contracted the disease, proving that they were immune the minute they were inoculated.

She did not like the dried virus at all: it seemed impossible to get a complete emulsion with it.

On the subject of dogs going down with distemper after being inoculated, an analogy might be drawn from the accepted fact that it was in the nature of some people to take measles several times, perhaps when they were by no means young; she thought the same thing applied with dogs, and therefore, in her view, if an occasional dog did go down after inoculation it in no way detracted from the value of immunisation.

Dr. J. T. Edwards (Lister Institute), when called upon by the President, said it was many years since he last had the honour of speaking at a meeting of the Society. He had come there that night really to listen to the speakers on the subject under discussion, because he had been engaged for some years on research—though not recently on distemper itself, into other diseases caused by filterable viruses—and he was anxious to learn what he could from the remarks of workers in the field, especially on practical methods of immunisation.

He would like, in the first place, to add to the tribute paid by Major Dunkin to Major Dalling and Dr. O'Brien concerning their grave responsibility in turning out on a commercial scale the class of preparations that had been described. For over seven years he had been engaged himself on that kind of work, and he could assure practitioners that it was an endless source of worry, particularly when one was called upon to issue in large quantities material like a protective serum which was destined to be inoculated into highly susceptible animals simultaneously with a live virus.

The action of hyperimmune serum as a therapeutic agent in clinical distemper—a problem which exercised the minds of a number of speakers that evening—would be profoundly modified by the extent to which secondary invaders (notably *Bacillus bronchisepticus*) had already obtained a footing in the susceptible tissues. In those cases in which symptoms of acute pneumonia were pronounced, it was not to be expected that an anti-serum prepared against the primary cause of the disease, namely, what

was now known beyond all doubt following upon the work of Laidlaw and Dunkin to be a filterable virus, would be of much benefit. Whether the serum was of benefit or not in an uncomplicated virus attack, and for how long after the onset the symptoms, could only be determined by direct experiment, such as had been carried out by Laidlaw and Dunkin. He (Dr. Edwards) recounted briefly the results of some of his early experiments (1913-1914) which pointed to the severity of the secondary disease caused by *B. bronchisepticus* in a rapidly spreading natural infection. In this type of attack, there was also evidence that the primary infection, that was liable to expose the animal to severe secondary invasion, might be a rather mild one.

With regard to the system of preventive inoculation advocated by Major Dalling as the most practicable one for ordinary use, namely the so-called vaccine-virus method, he would like to contribute a few words of, what he hoped would be, helpful criticism. He (Dr. Edwards) wished to say at the outset, from experience in active immunisation against rinderpest and acquaintance with the work that had been recorded in recent years upon attempts to make a satisfactory dead vaccine from infected tissues for inoculation against this disease, that he was rather prejudiced against the system favoured by Major Dalling in dog distemper. From personal experience in work of this kind in virus diseases and the evidence of the recorded literature, it seemed to him (Dr. Edwards) that when a virus embedded in a more or less considerable mass of extraneous material such as spleen pulp was treated with an agent like formalin with the object of making it inert while still remaining effective as an immunising substance, it would suffer progressive diminution in activity, the stages in which might be represented as follows: (1) virus still alive, gradually decreasing in concentration; (2) virus not alive, immunising power strong; (3) virus not alive, immunising power weak; (4) virus not alive, no immunising power. The ideal dead vaccine for use in the first inoculation according to Major Dalling's system would be attained at about stage 3; the second inoculation, with live virus, would then result in the production in the partially immunised animal, of very mild disease, and, it was presumed, a durable active immunity. If, however, the first inoculation was done with the material acted upon as far as stage 2 only, it was likely that the live virus injected at the second inoculation would entirely fail to multiply in the living animal and set up any degree of immunity consequent upon this inoculation. This view would receive support particularly from the results recorded by Daubney (1930) in East Africa in rinderpest vaccination and from certain personal observations in foot-and-mouth disease immunisation. It would be rather difficult, in routine preparation of a vaccine for field use, to ensure that virus in infected tissue had become changed by a process of slow annihilation to a desired stage. It was plain from the results recently recorded by Cooper, in India, upon attempts to repeat the method recommended by Daubney for the preparation of a rinderpest vaccine from infective spleen pulp by formalisation, that the same technique in the hands of different workers might give widely different results as regards the periods of exposure required to produce a satisfactory vaccine. What the possibilities of the method in practical field immunisation were might well be gauged, again on the analogy of rinderpest, from the discussion on this subject (particularly from the opinion expressed by Walker, in East Africa) at the last International Veterinary Congress, London (1930). It was also interesting to note that the present director of the Muktesar Institute, India, in his last report, asserted that experiments so far carried out at his Institute had not proved that the vaccines used against rinderpest in other countries were as safe or efficacious as the serum-simultaneous method as practised in India.

He (Dr. Edwards) had been interested to hear from the opinions expressed by speakers at that meeting who had considerable experience in the practice of immunisation against dog distemper that there was now among them also a strong bias in favour of the serum-simultaneous method. With this method, however, as applied to rinderpest—and it seemed to him from the trend of the discussion that evening that the experience already gained in dog distemper was parallel—there were many pitfalls, the full meaning of which could only be ascertained after several years' experience, and even now, in the case of rinderpest, were often obscure. It was presumed that the animal inoculated by this method would receive a dose of the fully living virus, uncontaminated with any other infective agent (which had often been found to play a serious complicating part in rinderpest immunisation) or noxious material, and, simultaneously, a suitable dose of protective serum.

It had been his belief, from the results of his earlier experimental work in India, that the dose of serum to be inoculated might well be laid down as indefinitely large, so long as it was well above the minimum dose required to obviate all risk of dangerous infection arising from the simultaneous inoculation of live virus. It was found, indeed, that a solid immunity resulted even when the dose of serum was increased to such an amount that all symptoms following upon the inoculation of live virus were completely "blocked out." It had been laid down that a "symptomless" reaction of this kind was what was desirable in field immunisation, because experience had shewn that animals often succumbed to the effects of secondary invaders when their resistance was depressed by a rather mild attack of rinderpest. When calves immunised at the laboratory in this way, so that they passed through a symptomless or almost symptomless reaction, were tested afterwards at intervals by inoculation of live virus, it was found, however, that their solid immunity sometimes began to wane after 18 months and disappear entirely in three years. This result was different from that believed to follow a natural attack of the disease, which was that the immunity was lifelong in duration, and from certain observations made upon cattle immunised in the field, notably in Egypt, which seemed to show that the immunity lasted up to about 13 years. Longer experience tended now to suggest that the duration of immunity bore some relationship to the clinical reaction following upon immunisation. Certainly, experimental work showed that the concentration of immune bodies in the blood after a symptomless reaction was very low, and only became high if the animal passed through a mild but decided reaction. A good deal of work covering a number of years would have to be done before this aspect of the problem could be determined in the case of dog distemper, but it seemed to him that in the meantime it would be a prudent course for practitioners to regulate the dose of serum in the serum-simultaneous method of immunisation so as not to suppress completely a distemper reaction. This reaction ought not to attain such degree of severity, however, that the defences of the animal became exposed to invasion with potentially dangerous secondary organisms, notably

B. bronchisepticus, lurking in the neighbourhood.

Other factors that had to be taken into account were the susceptibility of the animal to be immunised and the activity of the virus inoculated. A noteworthy phenomenon in some virus diseases was that very young, unweaned animals were highly insusceptible to infection by artificial inoculation, but became readily infected later, some time after weaning. That unweaned animals were unsuitable for immunisation against rinderpest, was shown, for example, by the results given by Walker (1930) in Kenya, who found that unweaned calves inoculated by the vaccine-virus method were usually not protected against contact infection or inoculation after weaning. In field work, in India, he (Dr. Edwards) had thought it was best not to immunise cattle against rinderpest until they had attained about 18 months in age. Besides the age factor, animals showed varying susceptibility towards this disease according to breed and country of origin, and again debilitated animals as a rule "took" very badly. These several conditions might well be found to have a corresponding influence in the selection of suitable subjects and in determining modifications in technique in practising the serum-simultaneous method in dog distemper.

The factor of virus activity needed special comment at the present time. He had found that in rinderpest immunisation it was necessary to impress upon field inoculators that the success of the serum-simultaneous method, in producing a lasting immunity, depended essentially upon the fact that the virus used must be certainly alive, and, therefore, potentially highly dangerous. He had no experience of the new method introduced by Major Dalling of prolonging the survival of the live virus by issuing it to inoculators in the form of desiccated infective tissue. In the raw infective material, however, it seemed that the viability of the virus was very fleeting. The disappearance of the live virus from the blood taken from an infected animal soon after exposure to air at ordinary temperatures had to be reckoned with, particularly in rinderpest immunisation. To some extent the rapidity with which the blood became inert depended upon its initial concentration in live virus, and in field immunisation he had had experience of such blood failing to convey infection when it was taken from relatively resistant donors and used for inoculation within a few hours. The safeguards found necessary to ensure that the blood inoculated contained fully active virus did not need to be discussed there: it was merely necessary to point out that the analogous experience already gained with rinderpest showed that the activity of the preparation used for the virus inoculation was most important.

There was a further point regarding the activity of the virus, apart from its viability, which seemed to be of great importance. In rinderpest, it was found that a strain of virus maintained by passage in susceptible cattle for a long time often underwent periodic fluctuations in virulence, the depressions being probably due to the effect of passage in a few resistant animals. It was also well known that strains of virus, from different sources, varied considerably in virulence, in a number of virus diseases, toward the naturally susceptible species. Beyond this, he had found that in the case of rinderpest the virus underwent marked attenuation in virulence for the naturally susceptible species (cattle or buffaloes) after it had been adapted artificially to and passaged for some time in other species of animals (rabbits, goats). This was shown very well in laboratory experiments in which it was found that a much lower dose of protective serum was required to suppress reactions in cattle inoculated with these adapted viruses than with viruses of cattle or buffalo origin. Recently, Stirling, working in the Central Provinces, India, had recorded some remarkable results showing that the naturally somewhat resistant plains cattle of India could be safely immunised by inoculation with goat-adapted virus alone, without simultaneous inoculation of protective serum. He (Dr. Edwards) was not sure whether from the work recorded upon the transmission of the distemper virus to species other than dogs, such as ferrets and fitches, it became, after prolonged passage in these animals, distinctly less virulent for the canine species. If it should prove that the virus could be fixed in this way, it might transpire that a much safer preparation would become available for the serum-simultaneous inoculation in distemper, and that the dose of serum to be administered could be much curtailed or, perhaps, eliminated, as was suggested from the analogy of Stirling's promising results in rinderpest.

With regard to one of the points raised by Dr. O'Brien, it had been his experience in rinderpest immunisation that the dose of active virus, in the form of highly virulent blood, that could be administered simultaneously with the dose of serum was immaterial, within very wide limits, and that immunity against natural infection was secured by this method from the moment of inoculation, or, as it was picturesquely expressed by Major Dunkin, "from the word 'go.'"

It would be very interesting to observe the changes in method found necessary in the practice of distemper immunisation in the course of the next few years, when sufficient time had elapsed to gain the necessary experience in the most appropriate system for use in field work. These changes, in his view, would necessarily be concerned with important points of detail, for the principles of attack had now been clearly established from the magnificent researches of Laidlaw and Dunkin on the subject.

Major Dunkin said that three years ago a number of fox-hounds in kennels situated in the West Country developed distemper, and the Master asked him to go down and see them.

For purposes of description he would divide the kennelled hounds into four cases:—

(1) Old hounds which presumably had had distemper at some time in the past and had recovered. These were apparently quite healthy.

(2) Two-season hounds which had received vaccine followed by virus and which were also quite healthy.

(3) One-season hounds which had received indifferent vaccine and virus and were the subject of clinical distemper.

(4) Young uninoculated hounds which were also sick and showing the typical symptoms of distemper.

From classes 3 and 4, he and Dr. Laidlaw had obtained from the blood stream of cases having a high temperature the virus of distemper, and from the lungs of dead hounds *Bacillus bronchisepticus* and streptococci.

The position in that kennel was as follows:—Hounds which had recovered from a natural attack were immune, not only to the true virus disease, but also to *Bacillus bronchisepticus* and the other organism mentioned. This was not surprising, because few people expected to see their dog develop distemper more than once. The remarkable thing was, however, that those hounds which had been subjected to vaccination with a good quality vaccine and virus of known potency were not only immune to the virus disease against which they had been immunised, but

appeared to be suffering no ill effects from the secondary organisms. The question of opportunity to become infected did not arise because the M.F.H., as a routine, always mixed sick hounds with healthy ones, working on the theory that the sooner the latter developed distemper and recovered or died, the better.

He (Major Dunkin) did not attach much importance to *Bacillus bronchisepticus*, for no vaccine he had ever used had been of any assistance in preventing the disease, but these remarkable cases, he thought, were worth recording.

The President (Major Hamilton Kirk) said that he would like to ask the essayist one question. Major Dalling's paper had been of particular interest to him, for he had been using the Laidlaw-Dunkin method with success since it was first introduced, and with one exception (of which Major Dalling knew) he had had no failures. He had never had abscesses or any violent reaction: he supposed he had been very lucky, but that was the fact.

A week or two ago he had employed the serum as a curative upon a Pomeranian which was in the early stages of a mild attack. It showed malaise, slight husk and watery eyes. Three doses of 10 c.c. each were procured, and a dose was injected daily. On the fourth day the dog—far from being better—was worse and the owner, on this account as well as that of cost, did not wish to proceed with it. Each of his visits cost the owner 7s. 6d. *plus* 7s. 6d. for the serum, and the treatment was costly.

He (Major Kirk) was now told that they would have to use 50 c.c. to achieve any effective result, and it seemed to him a prohibitive amount, in view of the cost. However, they had heard that night that horses could be hyperimmunised against canine distemper (surely a rather surprising thing) and consequently they might expect to get the serum cheaper.

The question he desired to ask was this: Did not Major Dalling think that the comparatively huge doses of vaccine and virus they would normally inject into a dog of six months of age, were too large for a puppy that had just been weaned?

Major Dunkin had said that serum would be of no use as a therapeutic agent if the disease were already clinically diagnosable. How, then, was one to know if a dog had or had not got distemper if the condition was not clinically diagnosable?

As regarded the serum-simultaneous method of immunisation, he understood that one could take such an immunised dog to a show with a fair amount of confidence that it would not contract distemper there.

Finally, was there any similar protective method for cats?

They were all greatly indebted to Major Dalling, Mr. Stainton and Major Dunkin, and also to Dr. O'Brien and Dr. Edwards for giving them such a fund of information on the ground covered by the paper. He only hoped that in due course it would be possible for them all to come back, as new discoveries were made, and lay before the Society still further information on that most interesting subject.

THE REPLY

Major Dalling, at the outset of his reply, expressed his gratitude to the Fellows for the way in which the discussion had been conducted.

They had had before them that night the problem of distemper as viewed both from the scientific and the clinical aspects.

It would appear from the discussion that the serum-virus method had given satisfaction in the hands of those who had spoken and that he was making too much fuss over some of the breakdowns that had been reported to him. In the last month or two they had had to deal with a few disturbing results following the use of serum and virus, though they had little or no trouble with vaccine-virus.

The type of trouble met with might be divided into two: (1) a severe reaction following the use of serum and virus; and (2) the breakdown of immunity. They had had at least four packs of fox-hounds which had been treated with serum and virus since January this year, and each, in the last week or two, had shown some evidence of a breakdown. That wanted some explanation: what it was, he did not at the moment know. He had no doubt that time would enable them to elaborate a safe method for the use of serum and virus. In the laboratory they found that the serum and wet virus gave nearly 100 per cent. results; the serum and dried virus (which they had now adopted for use in the field) did not give quite such good results. A failure of 5 per cent. became alarming when all the breakdowns occurred at once.

Several speakers had made reference to the question of abscess formation, and he knew what a disagreeable thing it was. At one time they thought it was due to particles of sand getting under the skin of the animal on injection, because at that time they mushed up the material with sand. The sand had been removed, however, and yet the abscesses continued. There might be some idiosyncrasy, or some type of protein reaction to account for them.

They had gone no further with the two doses of vaccine spoken of by Professor Wooldridge, but he would like to do something more in that direction.

He was very grateful indeed to Dr. Edwards for what he had told them. The latter had given them a brilliant address on the immunisation against rinderpest. He was deeply grateful, too, to Major Dunkin for entering into the discussion.

Several people had mentioned the question of the age at which dogs should be inoculated. The original recommendation was 12 weeks, and it was still recommended.

Concerning the use of serum, he still held that a large dose was necessary if a dog was affected with distemper. The value of hyperimmune serum lay in its use in dogs which had been exposed to distemper infection, or which were about to be exposed to it.

Dr. Edwards had brought up a very important question, *viz.*, the duration of immunity. So far as they knew, the immunity appeared to last for quite a long time, but he thought that now they were coming to a very important phase in the duration of immunity. There were some fox-hound kennels inoculated some five years ago, when Laidlaw and Dunkin first started inoculating, in which kennels no distemper had appeared since that time. It would be interesting to know if those dogs which had been inoculated subsequently were immune. Those inoculated five or six years ago had a chance of picking up some stray distemper infection, whereas there had been little chance of their infection since.

He did not know of any field method of diagnosing distemper.

As to dosage, as far as their experience went the toy dog stood 5 c.c. serum quite well.

He was very grateful to all of them for what they had said that evening, and he felt that the discussion had certainly been of great value, especially to him.

THE PATHOLOGY OF REPRODUCTION IN DOMESTIC ANIMALS*

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LECTURE No. II.

The Influence of the Health of the New-born Animal Upon Its Ultimate Breeding Efficiency

The menace to health begins at the commencement of life. It is quite certain that more fertilised ova, embryos and small fœtuses perish and disappear unseen than are born and aborted combined. Non-mortal diseases of the embryo often lead to the formation of monsters, or lesser aberrations, which lower or destroy the value of the animal. Keller observes that toy bulldogs commonly have slight hydrocephalus which has become a trait of the breed through artificial selection. Hydrocephalus constantly tends to interrupt the orderly development of the other organs of the body, especially of the genital organs. These breeds are of low fertility. In a group of monsters recently described, I have pointed out that in them, regardless of the location of the basic disease, aberrations of the genital organs were the rule.

The frequency of abortion indicates the abundance of utero-fœtal disease. It would be folly to say that all diseased fœtuses are aborted. Those not aborted but registered clinically as premature birth, still-birth, prolonged gestation and otherwise are just as definitely diseased as are those which are aborted and collectively they outnumber the abortions. Healthy gestation is highly uniform in its duration. When pregnancy is abbreviated or prolonged, it is conclusive evidence of fœtal disease. The young are born either evidently diseased or highly sensitive to the stresses incident to birth, and are markedly liable to the diseases of the new-born. The damage does not end there. Von Ottingen has well shown that foals carried overtime do not become highly valuable horses—the fœtal disease has left an indelible mark. Some dairymen regularly destroy definitely premature calves, because their experience has taught them that, as a rule, such calves do not become valuable dairy animals.

A young animal may be apparently healthy at birth but quickly become diseased. According to its severity the disease may cause a permanent general weakness; the normal development of the reproductive organs may be repressed and leave them weak, or various bacteria or other form of contagion may acquire a permanent habitat ready to cause disease at breeding time. The latter is well illustrated by the granular or nodular venereal disease which is universal in dairy cows, and common in beef calves as well as in sheep and swine. It frequently causes a very severe vulvitis in dairy heifers following the first coitus, the vulvar mucosa being intensely inflamed, covered with muco-pus, highly sensitive and bleeding at touch. The prepuce of young bulls occasionally becomes so severely inflamed that hæmorrhage follows coitus and sometimes causes phimosis. The symptoms decrease in intensity with age.

Dairy calves are the most unhealthy of all young domestic animals. The mortality is high, and those which survive commonly suffer from diarrhœa, pneumonia, arthritis, chronic indigestion with pasty fæces, emaciation, pot-belly and dry, rough, dirty coat. When five to six months old they apparently regain their health.

When discussing the pathology of reproduction in perspective, the observation was made that reproduction is a luxus function and is not physiologically undertaken by mammals until the individual has acquired a surplus of nutritive energy in excess of its needs for the maintenance of its physical life. It has been stated above that in monsters and lesser embryonic aberrations there is a pre-eminent tendency toward the arrest or aberration of the genital organs of both sexes, regardless of the location of the basic disease of the embryo. So in harmony with the general principle of reproduction as a luxus function, the constructive powers of the embryo are preferentially devoted to the formation of the organs essential to physical life, and any deficiency of nutritive energy is likely to be expressed in the form of imperfect development of the genital system. Weak fœtuses accordingly manifest a marked tendency toward arrest in the growth of the organs of reproduction. Thus in the new-born male—the male sex is dominant amongst aborts and weak new-born—cryptorchidy is more common than arrests in the growth of systems of organs essential to life. After birth there is a period in all mammals during which the reproductive system is functionless. In conformity with the general principles mentioned, the nutritive demands of the organs essential to life continue to take precedence over those of reproduction. It should therefore be logically expected that if the nutritive supply of the dairy calf is severely depressed by faulty artificial feeding, accompanied by serious digestive disturbances,

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the ideal development of the reproductive system would be correspondingly menaced.

As a rule when a dairy heifer is six or seven months old she begins to ovulate and may conceive if opportunity occurs. Her genital system has been hurriedly developed and its general proportions and ultimate texture fixed. Each part of the system may grow with the age of the animal, but unless the organs are up to normal scale, compared with functional activity when ovulation begins, there is ample evidence to show that the genital system will not reach full physiological development, but the heifer will arrive at breeding age with juvenile sexual organs, incapable of satisfactory reproduction. They are sexually weak; œstrum is often irregular and they sometimes menstruate excessively. Many of them conceive tardily, or not at all. In some herds, a given crop of heifers show a very high ratio of incurable sterility. Pregnancy is unsafe; many abort or expel dead calves at term; dystocia is common; the fœtuses are preponderantly males, and the ratio of twins is excessive. The calves are largely born at less than 280 days; are small, sensitive, of low resistance and suffer from diarrhœa. The heifers largely retain their afterbirths; uterine torsion and prolapse are not rare, and any or all things may occur except typical physiological birth.

TABLE I.

Observations Upon a Group of 18 Heifers Bred to First Calve in 1912.
A=abortion. B=bull. H=heifer. S=sterile. X=premature birth.

No.	Born	1912	1913	1914	1915	1916	
1	12- 6-09						Destroyed account gangrene of uterus and emphysema of fœtus.
2	10- 6-09	A					Died of metritis.
3	2-24-11	A					Slaughtered, sterile.
4	10-30-10	A					Slaughtered, sterile.
5	9- 6-10	A	A	S			Slaughtered, sterile.
6	9-29-10	X B	S	B H	S	B	Slaughtered, sterile.
7	11- 6-10	A	B B				Died of metritis.
8	4-26-11	H					Slaughtered, sterile.
9	7-20-10	B					Retained afterbirth, sold, inefficient.
10	1- 1-11	B	B				Sold, gangrene of udder.
11	2- 5-11	A	B	B	B		Sold, inefficient.
12	9-22-10	A	H	B			Died, indigestion.
13	10- 5-10	H	B	H	B		Sold.
14	10-20-10	H	S	B	B	B	
15	10-18-10	B	H*	S	B B		
16	10- 5-10	A	B	B	B	H	
17	10- 5-10	A	H	B			
18	12- 9-10	A	H	H*	H	B	Died.*
Heifer calves		3	4	3	1	1	Total 12
Bull calves		4	6	6	6	3	Total 25
Abortions		11	1				Total 12

Original Heifers.

Died	4
Slaughtered sterile	5
Sold	4
On hand, 1916	5
Heifers grown to breeding age	8
Heifers not of breeding age	2

The pathological phenomena vary in different herds and at different times. Sometimes abortion dominates, associated with retained afterbirth and subsequent sterility. This is well illustrated in Table I. The group consists of 18 dairy heifers comprising four breeds. The calves of the herd had been grown, for a number of years, under " pesthouse " conditions, in a poorly-lighted and ill-ventilated basement; always swarming with flies. The stalls could not be kept clean. The calves regularly suffered from severe diarrhœa, with a high incidence of pneumonia and death. Arriving at breeding age, there was year after year an average abortion rate of about 50 per cent. in first pregnancy, after which sterility was common. The herd was not reliably self-sustaining.

It will be observed that among 37 births there were three pairs of twins, or a ratio of 8 : 100. The plan of calf growing was modified and the abortion rate in first pregnancy dropped below 10 per cent.

TABLE II.

Changes in the breeding efficiency of heifers during their first breeding year, after Modification of the feeding of heifer calves.

Group	Period Covered.	Heifer Calves Born.	Died of Scours and Pneumonia.	Died of Other Causes.	Sold for Veal.	Pregnant or Below Breeding Age.	Number in Which Pregnancy Has Terminated.	Calved.	Aborted.
I	1909-1912 40 months	593 ...	184 31%	113 19%	118 19·9%	... ...	170 ...	95 55·9%	75 44·1%
II	1912-1916 50 months	904 ...	203 22·4%	71 8%	... ...	402 ...	225 ...	203 90·2%	22 9·8%

In Table II the problem is illustrated from a slightly different angle. In a dairy of 500 milking cows, the mortality of young calves had been very high for a number of years. When the heifer calves reached breeding age the average abortion rate exceeded 40 per cent.; associated pathological phenomena were excessive, and the calving heifers milked badly. Tuberculosis was common in the herd and as a means of combating it, after discarding tuberculin reactors, the milk for the calves was pasteurised. The accuracy of pasteurisation was doubtful; unless fed quickly after pasteurisation, the milk underwent fœtid decomposition. Under the environment, boiling of the milk was advised. The calves were continued in the same buildings and after the close of milk-feeding were grazed in the same pastures and in winter kept in the same stables and in general had care identical with that of the first group. Upon reaching breeding age they were bred to virtually the same bulls.

In Group I mastitis was common in first lactation; in Group II it was rare.

The influence of the health of the heifer calf upon her future breeding efficiency is still better illustrated in Tables III and IV.

In 1920 I was asked to purchase 20 Holstein heifers and five bulls as a foundation for a dairy herd in the tropics. It was requested that the animals be free from tuberculosis and contagious abortion. Neither bacteriological nor serological test for abortion was made. The animals were selected from two herds upon an intimate personal knowledge of the breeding health prevalent in the establishments. Seventeen heifers were selected from a herd composed of animals having thoroughly respectable, but not fashionable pedigrees in which it was known that the sexual health was exceptionally good and the young calves unusually healthy. In Table III they constitute Group A. The other three heifers were selected from a herd composed of animals of highly fashionable pedigree. The sexual health of the herd was only fair.

TABLE III.

Breeding Statistics upon Three Groups of Cows on the same Ranch.

Group.	No. Females.	Viable Calves.	Av. Viable Calves per Cow.	Non-viable Young.					Twins.
				First Pregnancy.	Per cent.	Pluripara		Per cent. of All Pregnancies.	
						No.	Per cent.		
A	17	139	8·2	0	0	7	4·8	4·8	1=0·72:100
B	38	212	5·58	8	21·7	30	14·1	15·2	8=3·2:100
C	196[1]	346	1·8	72	36·7	62	21·8	27·9	6=1·3:100

[1]—32 females in Group C had not yet calved or had not been known to have aborted by November 30th, 1931.

TABLE IV.
Group C.

Year of Birth.	No.	First Preg. not Terminated.	Calved or Aborted.	Total Preg.	Viable Calves.	Viable Calves. per Cow.	Non-viable Young.					Rain.
							First Preg.	Per cent.	Later Preg.	Per cent.	Total Per cent.	
1920	5	0	5	26	18	3·6	3	60	5	24·0	31	14·89
1921	9	0	9	63	55	6·1	1	11	7	13·0	12·7	21·82
1922	14	0	14	60	50	3·6	0	0	10	21·0	16·7	26·98
1923	19	0	19	71	59	3·1	3	15·8	9	17·3	16·9	40·48
1924	33	0	33	92	69	2·1	8	27·6	15	23·8	25·0	20·67
1925	26	0	26	50	31	1·2	12	46·3	7	29·2	38·0	13·27
1926	41	0	41	61	35	0·85	19	46·3	7	35·0	42·6	12·16
1927	33	6	27	35	16	0·48	17	63·0	2	11·1	54·3	31·49
1928	48	26	22	22	13	0·27	9	40·9	0	0	40·9	26·07
	228	32	169	480	346	1·8	72	36·7	62	21·8	27·9	23·09

In 1921 35 additional heifers were purchased which, with the three fashionably bred animals already mentioned constituted Group B in Table III. The 35 heifers came from seven herds scattered from Ohio to North Dakota. So far as known they were selected upon the basis of pedigree and physical appearance. I was familiar with breeding conditions of the herds from which a majority of the 35 animals were selected and knew that at best the sexual health could be classed as fair only, and that in general the young calves were unhealthy.

Groups A and B have been handled throughout as a single herd. They have not been stabled. They have occupied a common paddock and necessarily have shared identical forage. They have been bred to the same bulls. The nine large herds from which the heifers were selected (many, if not most of which suffered seriously from genital disease) doubtless harboured in abundance every form of contagion commonly associated with abortion and other pathological phenomena of reproduction. Most of the heifers were pregnant, some in early, others in late gestation. Some had not been bred. Ample opportunity was thus provided for carrying into the new herd any common genital infection capable of existence in any stage of gestation or in non-pregnant heifers. Important evidences of genital disease appeared in Group B while in transit. There has been every opportunity, year after year, since 1921, for the thorough dissemination of any contagion or contagions throughout the herd. Genital disease has taken a heavy toll from Group B, while Group A has calmly adhered to good genital health and made a wonderfully high record for fertility until they had reached ten to fourteen years of age when old age, combined with severe drought and innutritious forage, lowered their vitality, and some abortions occurred. Eight of the 17 still live. The group has now produced an average of 8·2 viable calves each. Should the eight surviving cows produce 14 additional calves, which appears quite probable, the average calves per cow will exceed nine. Naturally Group A has far excelled Group B in milk production. A detailed study of the herd reveals no plausible explanation for the differences in fertility between the two groups except that the cows in Group A had acquired as young calves a highly valuable, intrinsic defensive power. The pathological phenomena consisted largely of stillbirths, with severe dystocia, at or near term, with numbers of abortions and retained afterbirths.

The female progeny, Table IV and Group C in Table III, were kept in a common enclosure and fed and handled alike. Upon reaching breeding age they were placed in the common herd with Groups A and B. During the nine years from 1920 to 1928 inclusive 228 heifers had been grown and bred so that, if genitally healthy, they should have calved prior to December 1st, 1931. In Table IV it is indicated that 32 of these had not been recognisably pregnant. The conditions were such that early abortions might largely escape detection.

In the early history of the herd, the total number of calves per annum was small, and they were healthier than in later years when the progeny of the original females had begun breeding. The calves were fed in a group, devoid of individual control or isolation. They had an abundance of whole milk for an additional three months. Much milk was spilled at the feeding place and the soil became polluted and stinking. Horses were allowed in the calf

paddock and the calves ate horse fæces. In dry periods, which were frequent, succulent grass was scarce or wanting and the calves ate freely of dry grass and weeds. Diarrhœa was common and pneumonia was not very rare. The mortality was low. The survivors suffered much from chronic diarrhœa, adhesive fæces, cough, pot-belly, rough hair and emaciation. They rallied at six to eight months and grew fairly well but were generally undersized, pot-bellied and notably narrow and peaked behind.

When they arrived at breeding age they conceived very tardily; apparently many conceptions ended early and unobserved; the recognised pregnancies were unsafe, abortion was common; dystocia was the dominant phenomenon, with a very high ratio of still-births or dead calves. The entire genital system was markedly juvenile, the ovaries small, the uterus and vagina sub-normal in dimensions and in defensive power. The outstanding phenomenon in the defective development was an extremely narrow vulva. Heifers three years old and upwards, weighing 800 to 1,000 pounds and more, and six months pregnant had vulvæ which would not admit the introduction of more than two or three fingers without the application of definite force. Several heifers were killed outright by the forcible extraction of the fœtus. In two cases the forcible extraction of dead fœtuses caused complete perineal rupture from which they survived. Each again conceived, followed in one by the expulsion of a dead fœtus, in the other by a viable calf.

I applied traction as gently and carefully as possible and by working patiently for two or four hours was able to extract the fœtuses without causing extensive lacerations, but the long continued and severe compression of the vulvo-vaginal mucosa inevitably led, in many cases, to very severe gangrenous vaginitis with a tendency to vaginal atresia which required constant attention for weeks. In the severe dystocias the fœtuses were usually bulls; frequently presented posteriorly. Often the fœtus was alive at the beginning of the labour but succumbed during, or immediately after extraction. Dropsy of the amnion and allantois was very common; hydrocephalus with deformed extremities was not rare. Retained afterbirth with metritis was the rule. No method of delivery could be devised which might evade the disaster: an unshakable foundation for disaster had existed throughout gestation. The heifers, as young calves, had failed properly to develop the genital system. The milk-feeding period of six months having passed without proper sexual development, and ovulation having set in, the sub-normal development of the reproductive system became permanently fixed both in dimensions and in defensive power against contagions.

The significance of these observations rests upon the large number of animals involved, all reared, handled and bred alike, followed by highly prevalent pathological phenomena of relatively uniform character.

Identical phenomena are observed by every clinician with experience in dairy practice; but the cases are solitary and their basic significance is lost. Sterile dairy heifers are repeatedly encountered with vulvæ too small to admit the operator's hand, and much labour is devoted to mechanical dilation under the assumption that, if the dilation succeeds, the way will be open for overcoming the sterility. The assumption is generally erroneous, the basic cause of the sterility lying far deeper. The mechanical dilation of the vulva does not eliminate hypoplasia of the whole reproductive system.

Some such heifers conceive; gestation continues to term, and the clinician is called to overcome dystocia, dependent upon a very narrow vulva. The basic character of the dystocia is variously interpreted by the clinician dealing with isolated cases. Sometimes it is believed the vulva is too small, at others, that the calf is too large. Any calf is comparatively too large in such a heifer; the heifer is not big enough anatomically or physiologically to give birth to an object which might be justly regarded as a calf. One of the heifers in Table IV was in dystocia from abortion. The heifer would weigh about 700 to 800-lbs. The abort was the size of an ordinary cat. I worked hard for an hour to pass my hand through the vulva. The abort lay free in the cervix but I could not extract it with my hand because the vulva would not permit the passage of the head along with my hand, and I was compelled to pass forceps along my hand, grasp the head, withdraw my hand and then extract the fœtus with forceps. With much after-care the vulva was moderately dilated. She conceived again and was again in dystocia; the fœtus was dead and the heifer failed to lactate.

The cattle represented in Tables III and IV were wholly dependent upon grazing except for the milk feeding to young calves and limited grain allowance to cows in milk. The quantity and quality of forage is dependent upon rainfall, which is regularly recorded day by day to the one-hundredth of an inch. The total for each year is indicated in Table IV. At times severe drought prevails for months in succession and the forage is dry and woody. This lowers the strength of the pregnant cows, the calves are born less vigorous and are compelled to eat dead grass and weeds. Sometimes the precipitation is low throughout the year, as in 1925-1926. The general effect of such drought is traceable in the fertility of the herd and markedly in the health of the calves, as well as in their fertility when reaching breeding age.

The causes of sexual disease rarely, if ever, act singly and the force of one cause is regularly modified by other factors at work. Thus in Table IV there is a wide variation in the behaviour of the 1920 and 1921 heifers. The numbers involved are small and the implications need be accepted with caution. They were apparently cared for alike as young calves. Dairy cattle are amongst the most sensitive of domestic animals. Intense breeding with heavy lactation places upon them an inordinate sexual load. Pregnant females withstand transportation and change of environment badly, and show a definite tendency to abort or calve prematurely from the disturbance. The dams of the five 1920 heifers were shipped in advanced pregnancy 3,000 miles by rail, 2,000 miles by boat and finally transferred to a small boat for a normal sail of 14 hours. The small boat ran into an unusually severe storm and the heifers were tossed about unmercifully for 32 hours. The decks were awash, their halters were broken, and it was impossible either to feed or to water them. Ordinarily a high rate of abortion would have followed. They landed in July, and five of them were to give birth to the 1920 group of heifer calves within three to five months. Perhaps the severe physical and psychic strain through which the pregnant heifers passed was reflected in the breeding health of the calves carried *in utero*. In the 1921 group of heifers their dams had had a longer period for recuperation from their journey before the calves were born. Some of the calves were of the second crop, the result of breeding after arrival in the new environment.

A second, and more important element affecting the relative fertility of the 1920 and 1921 heifers was the question of precipitation and consequent state of forage. The heifers, greatly fatigued from their long journey, had arrived during a severe drought. This lowered the nutritive supply, depressing the vigour of the pregnant heifers and of their intrauterine young. The calves, born less vigorous because of the drought, were denied succulent forage. At the close of 1920 heavy rains came, and the rainfall for 1921 was good; the pregnant heifers were knee deep in lush grass and the new-born calves had ideal forage from the first.

The contrast between the two groups is sharp. The 1920 group show an average of 3·6 viable calves per cow: four of the five cows have succumbed to sexual disease. As a group they are apparently destined to fall below five calves each. The 1921 group has produced 6·1 calves each; surpassing Group B, which are about two years older. Almost all are living, are in apparently good general and sexual health, and should reach an average calf production of nine to 10.

In harmony with current thought, many would attribute the destructive genital disease primarily to contagion. That contagion was present in abundance is undeniable. The abortions, the metritis, retained fœtal membranes, gangrenous vaginitis and the endless list of pathological phenomena would be unthinkable in the absence of bacteria. The vital question to be determined is whether the contagion was basic and capable of producing destructive disease in animals not profoundly depressed by methods of feeding and handling, or whether the contagion was of low invasive power and became destructive only in weak, defenceless animals. Perhaps it would be justifiable to ask whether the contagion was primary or secondary. If it were a primary contagion of ample invasive power it should have definitely involved in the maelstrom the females in Group A, Table III, and the 1921 crop of heifers in Table IV. They mingled freely year in and year out. The contagion could not, by any conceivable means, have invaded the herd from without. No animal of either sex has been added to the herd since 1921. Surrounding the herd on every side is a herd of 25,000 Herefords, with thousands of breeding females, separated from the dairy herd by wire fences. The Herefords are in a very high state of sexual health; any extrinsic contagion would need pass through this healthy cordon five miles deep at its narrowest point. The evidence all pointed definitely to intrinsic, intra-herd causes.

Careful study indicated with great emphasis that the most important and basic cause lay in the errors in the handling of young calves. After six months of constant study, with trials and failures of various plans, a sufficient number of portable calf pens were constructed to accommodate each calf up to one month of age. The pens were arranged in a row at one end of a field and were moved daily to fresh ground, from which all dead grass, weeds and rubbish had been carefully removed. When the line of pens had reached the farther end of the enclosure, sun, wind and rain had effectively cleansed the turf at the point of beginning, to which the pens were removed. The plan exposed to full view the fæces of each calf and made it easy at all times to determine the state of digestion. It prevented the calves from eating or swallowing any form of rubbish or indigestible substances, and prevented the dangerous habit of sucking each other. The portable pens were supplied with a detachable cover sufficient in extent to protect from rain or hot sun. The cover had attached to it a drop side which could be dropped upon the windward side and protect the calf against cold wind and rain. When one month old, they were turned together in a paddock with abundant grass. They were fed whole milk in

stanchions on a concrete platform, each calf having a separate pail. After taking their milk they were fed a little dry grain and kept confined in the stanchions until their muzzles were dry and free from milk. They did not suck each other. The stanchion platform was washed with hose after each feeding and the gates to the stanchion enclosure closed so that the calves could not enter until the next feeding time.

The formula for feeding was as follows: The calf was permitted to remain with the cow for 12 to 24 hours, and then placed in a portable pen and allowed no food, if apparently well, for at least 12 hours. It was then fed one pound each of milk and lime water in which 4-oz. castor oil had been emulsified. The calf does not object to the castor oil but readily ingests it with the milk. The ration of one pound each of milk and lime water, without the castor oil, was continued twice daily until the calf was six or seven days old. If at that age the calf was well the lime water was discontinued and the amount of milk cautiously increased to a satisfactory ration. If at any time diarrhœa appeared, or the fæces were streaked with blood, or were fœtid, or sticky, or other signs of indigestion were present, the castor oil was repeated and the ration of one pound each of milk and lime water resumed.

The effects were very striking. Indigestion was effectively controlled, the calves were vigorous and playful, their coats retained their original lustre, they were not pot-bellied and in spite of the limited ration they grew well and were at no time gaunt. The ration cost less per day, the lime water and castor oil included, than the milk ration ordinarily recommended. At six months they were much larger, and of far better conformation, than under the old plan. The peak rump had disappeared and so far as could be determined they were in ideal health. The first of these are now two years old and ready to breed. I look forward with great confidence to satisfactory breeding and their ability to carry the burden of reproduction with the same efficiency as Group A and the 1921 heifers of Group C.*

*Since the foregoing was written an authentic report is at hand that all the heifers born during the first nine months under the revised plan of feeding had been bred. Almost all conceived after a single service and none required more than two services.

The Irish Free State is easily the most important cattle exporting country in the world. This fact is shown in the latest Report on Trade and Shipping Statistics just issued. Cattle exports in 1930 reached 857,878, whilst exports under this head from Mexico, which came second in the list, amounted to only 173,085.

Clinical Communications

THE PARASITIC ORIGIN OF POLL EVIL AND FISTULOUS WITHERS

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Although it has been known for some time that cases of poll evil and fistulous withers have occurred where the presence of the *Onchocerca cervicalis* has been detected, Mr. Noel Pillers has again done very useful work in drawing the attention of the profession to the presence of this parasite in cases of poll evil in this country (*vide Veterinary Record*, December 12th, 1931). It has yet to be decided whether the parasite is the causal organism or merely established as a harmless parasite in the same way as Sarcosporidia occur in the muscles of cattle.

One has usually associated the cause of poll evil and fistulous withers with traumatism. In some cases evidence can be collected where the actual blow or abrasion was the beginning of the condition, whereas many cases are met with where one cannot account for the onset of the condition. I have seen several cases in three-year-old colts, that have never been broken in or stabled, exhibiting at the same time both poll evil and fistulous withers. I well remember seeing, some years ago, two three-year-old colts that had never been worked. One had poll evil and fistulous withers and the other had both these conditions *plus* acute gonitis in one stifle. The farm was a hilly one with streams running through most of the low-lying portions. The owner informed me that he had had several such cases in young animals. I throw out the suggestion that gonitis may be caused by the same parasite. Careful observation will show that these cases occur after the horse has been "turned out" to grass for a time. After being brought up and worked, these cases of poll evil, gonitis, etc., make a sudden appearance.

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A CONGENITAL DEFORMITY OF BOTH EYES IN A CALF

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The accompanying photograph of a nine-months-old calf (heifer) shows a peculiar defect from birth. Both eyes exhibit a distinct bulging, but no apparent increase in intra-ocular tension, and appear to be fixed in the position shown.

The squinting is so pronounced that half of the pupil is obscured by the inner canthus. The iris reacts to light and dark normally.

Although vision is impaired the calf can see sufficiently well to avoid obstacles and find its way about.

From its expression and the way it moves its ears, the calf relies on hearing considerably more than is usual.

The animal is well grown, in good condition, and appears to be very healthy.

* * * * *

A CASE OF OPEN JOINT IN A HORSE*

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Subject.—An aged Clydesdale gelding.

History.—The horse had been running with another gelding and a mare at grass when the owner observed the horse under discussion to be slightly lame on the off hind leg. On closer examination he observed a wound, on the outside of the hock, which was discharging joint oil.

Professional aid was sought that afternoon.

Clinical Appearance.—The wound was located on the lateral surface of the hock, three-quarters of an inch behind the peroneus tendon and on the upper third of the joint. It was estimated that it would open internally about the junction of the tibia and tibial tarsals.

The skin wound was of the flap type and somewhat smaller than a threepenny-piece. On reflection of the flap a smaller puncture-wound was observed involving the joint cavity. There was a slight trickling of synovia which became markedly increased on flexion of the joint.

There was very little evidence of local inflammation.

Treatment.—The skin in the region of the wound was denuded of hair. The wound and the surrounding skin were painted with iodine.

An iodine injection was prepared, consisting of one part tinct. iodi. fort., and seven parts water.

Five injections of 1 c.c. each were made, subcutaneously, at distances varying from about 1-1½ inches from the wound and a series of injections, of a little more than 1 c.c. altogether, made just round the edges of the wound and into the flap of skin.

The wound was then dusted with a powder consisting of chinosol and boracic acid 1 : 8 and instructions left for this to be repeated frequently on the ensuing days.

The horse was put in slings.

The patient was seen four days later, when the œdema in the region was quite distinct, but not to the extent anticipated.

The farmer reported that the synovial discharge had ceased the day following our visit.

The wound was granulating nicely and the applications of dusting powder were still being continued. Instructions were left to keep the horse in slings for another five days, tied up in stall for two or three days and then turned out to grass.

Remarks.—Tinct. iodi. fort. was only used in the absence of tinct. iodi. mitis. An injection of the latter with equal parts of water is to be recommended, as when the tinct. iodi. fort. is used iodine is precipitated from the strongly aqueous solution.

*Case in series submitted for award under the N.V.M.A. Clinical Prize Scheme for Students, 1931.

MODEL ABATTOIR SOCIETY

The Annual General Meeting of the Model Abattoir Society was held on Wednesday, June 8th, at 38, Belgrave Square (by kind invitation of Sir John and Lady Power). The President of the Society, Sir James Crichton-Browne, LL.D., M.D., D.SC., F.R.S., was in the chair, and reviewed the principal activities of the Society during the previous year. The Report of the proceedings of the Society and a financial statement for the year 1931, were presented and approved, and Members were elected to serve on the Council of the Society.

The President pointed out that the objects of the Society, which had been established for 50 years, were in the best interests of public health and humanity, and he made a special appeal to all present to assist, as much as possible, in securing an increased membership, especially in this year of the Society's Jubilee.

Reports

COUNTY BOROUGH OF BIRKENHEAD

ANNUAL REPORT OF THE CHIEF VETERINARY OFFICER FOR THE YEAR 1931

The annual report of the Chief Veterinary Officer of the County Borough of Birkenhead, for the year 1931, is a very comprehensive one. It has been issued in three parts dealing with the following:—

Inspection of Meat, Milk and other Foods.
Diseases of Animals Acts.
Corporation Stud.

This is a very important report in that its result is a good criterion to gauge the healthiness of imported animals as compared with the home-bred animals, as Birkenhead is a very large port at which imported animals are received and slaughtered.

From the report we see that at Birkenhead there are within the Borough four main slaughtering centres:—

(*a*) The group of slaughterhalls at Woodside Lairage.
(*b*) The emergency slaughterhouse at Wallasey Landing Stage.
(*c*) The emergency slaughterhouse at Wallasey No. 4 Shed. (The foregoing are owned and regulated by the Mersey Docks and Harbour Board.)
(*d*) The Corporation Public Abattoir at Tranmere.

At Woodside Lairage, the animals slaughtered consist chiefly of Irish, Manx and Canadian cattle, together with occasional consignments of sheep and pigs.

At Wallasey Stage, casualty and emergency cases of cattle, sheep and pigs are dealt with, while at Wallasey No. 4 Shed, sheep detained on account of lameness or disease are dealt with..

At Tranmere Abattoir, chiefly home-fed cattle, sheep and pigs are slaughered.

It is evident from this report that Mr. Burrow has organised his Meat Inspectors and other officers in such a manner as to carry out the greatest amount of inspection with the number working under him. It is also evident that the meat inspection staff at Birkenhead are constantly working amicably with the members of the meat trade and the owners of the cattle welcome veterinary inspection of animals, both *ante-* and *post-mortem*.

The following table shows the various origins of the animals slaughtered:—

ANIMALS SLAUGHTERED DURING 1931

	Oxen.	Calves.	Goats.	Sheep and Lambs.	Pigs.
"Irish"					
Woodside ...	43,401	—	—	42	637
Wallasey and No. 4 ...	123	—	4	740	225
Total	43,524	—	4	782	862
"Manx"					
Woodside ...	98	—	—	—	3
Wallasey and No. 4 ...	—	—	—	67	—
Total	98	—	—	67	3
"Canadian"					
Woodside ...	9,933	—	—	—	—
Wallasey and No. 4 ...	—	—	—	—	—
Total	9,933	—	—	—	—
"Home-Fed"					
Tranmere Abattoir...	210	1,060	—	11,582	4,241
Grand Total	53,765	1,060	4	12,431	5,106

Total Animals Slaughtered, 72,366.

The total numbers of carcasses condemned for tuberculosis were as follows:—

	Oxen. No.	Oxen. Wt. (lbs.)	Calves. No.	Calves. Wt. (lbs.)	Pigs. No.	Pigs. Wt. (lbs.)
Whole Carcasses (Tuberculosis)						
Irish ...	123	71,147	Nil.		4	745
Manx ...	1	700	Nil.		Nil.	
Canadian .	2	1,246	Nil.		Nil.	
Home-fed ...	3	1,236	6	489	16	2,273
Total ...	129	74,332	6	489	20	3,018
Whole Carcasses (Other Conditions)						
Irish ...	78	41,711	Nil.		129	24,965
Manx ...	Nil.		Nil.		Nil.	
Canadian ...	Nil.		Nil.		Nil.	
Home-fed .	1	705	3	202	8	759
Total ...	79	42,416	3	202	137	25,724

The total weight of all meat and offal condemned at slaughterhouses during the year was 217 tons 13 cwts. 1 qtr. 24 lbs.

In connection with the disposal of condemned meat, full advantage is taken of the fact that meat has an appreciable residual value and, by arrangement, all condemned meat is handed over from the Corporation to a Refining Company, who use it in the manufacture of fertilisers and poultry food, etc., the Refining Company paying the owners at the rate of £3 per ton for the meat, in the case of livers £1 per ton and 1s. for offal. This seems to be an ideal and

economic method of disposal of unfit food products, provided the Corporation are able to keep full control from the time meat is cut down until it is received by the Refining Company.

In addition to the work of meat inspection in the slaughterhouses, the Veterinary Officer at Birkenhead is responsible for the inspection of butchers' shops and other foodshops, the total number of visits paid to foodshops, including those of butchers, being 4,967. Mr. Burrow mentions in his report, in connection with the open windows of butchers' shops:—

"Perhaps the greatest need for improvement is in the conditions under which meat and food are exposed for sale. The practices of allowing butchers' shop windows to remain open, thereby exposing meat to possible contamination by dust, etc., blown up on to it from the streets, and of hanging outside shop-fronts portions of bacon covered only with material which is not impervious to dust, are both highly objectionable from a hygienic point of view. One hopes that future legislation will effectively put an end to both these practices.

"In several cases necessary structural alterations at premises have been carried out by the owners at our request in order to comply with the Public Health Acts and Public Health (Meat) Regulations."

A very small percentage of meat and other foods was considered unfit at the retail shops, and this is explained by the fact that most meat is examined at the slaughterhouses before it goes to the shops, and in the case of carcasses brought in from outside, they are submitted for inspection before being offered for sale.

In connection with the imported mutton, which has been specially examined for caseous lymphadenitis, the following statement shows the small percentage of cases now met with:—

New Zealand ...	445 carcasses ...	none affected
Australia ...	4,202 carcasses ...	1 carcass affected.
South America	526 carcasses ...	3 carcasses affected.
	5173	4

It is interesting to note that casings are prepared at Birkenhead and must be accompanied by a veterinary certificate before being sent abroad. During the year, certificates for the export of animal products were granted as follows:—

To Holland: 50 casks of beef casings weighing 14 tons 8½ cwts.

To France: 6 casks of beef casings weighing 1 ton 13 cwts.

To U.S.A.: 2 casks of beef casings weighing 10 cwts.

The second section of the Report deals with the inspection of dairies and cowsheds in the Borough under the Milk and Dairies Order of 1926 and is an important section of the work of the Veterinary Department. The report shows that there are 16 farms, with a total of 280 cows, from which milk is produced, within the Borough. As a result of the visits of the Veterinary Officer during the year, there were four cases of tuberculosis of the udder, two cases of tuberculosis emaciation and three cases of chronic cough with tuberculosis, dealt with under the Tuberculosis Order. In other cases affecting the milk supply, the animals were isolated until they recovered.

In the Borough of Birkenhead there is one large herd of 70 cows producing Grade "A" Milk.

In connection with the milk supply from outside the area, 375 samples were taken during the year for the detection of living tubercle bacilli. Of these 38, or 10 per cent. were found to contain living bacilli. The following table shows the origin and the percentage infected from different areas:—

	No. of separate samples sampled.	No. of samples taken.	No. of samples tuberculous.	(Per cent. based on number of supplies.)	(Per cent. based on number of supplies.)
Cheshire ...	135	269	31	23%	11·5%
Flintshire ...	33	62	5	15%	8%
Denbighshire	18	33	2	11%	6%
Lancashire	2	4	—	—	—
Shropshire ...	2	7	—	—	—
Total ...	190	375	38	20%	10·1%

As an example of the thoroughness with which the veterinary work is carried out in this district, the farms from which the 38 samples were sent in were all visited by the County Inspectors of the district accompanied by Mr. Burrow, and as a result of the examinations 35 cows affected with tuberculosis of the udder were traced and slaughtered. This is an unusually high percentage to find as a result of visiting the farms.

The next section of the report, dealing with the Diseases of Animals, shows that there was one case of anthrax dealt with during the year, and 9 cases of animals dealt with under the Tuberculosis Order, these being the only cases of Scheduled Diseases.

In connection with tuberculosis in calves, of the 1,060 calves slaughtered five cases were found affected with congenital tuberculosis and five cases of tuberculosis with post-natal origin. In nine cases they were able to trace back from which farms these animals had come, and this tracing back resulted subsequently in the detection of nine tuberculous cows, five of which were affected with tuberculosis of the udder.

If such a method were carried out at all the slaughterhouses throughout the country, it would necessarily have a great effect in the immediate removal of many tuberculous cows from milking herds.

The third section of the report deals with the Corporation horse stud. The report shows that

Birkenhead Corporation are the owners of 58 horses. There were no deaths during the year.

In the list of cases treated there is, what is nowadays looked upon as a comparatively rare disease—lymphangitis: there were 10 cases during the year, which seems to be a high percentage in a stud of 58 horses.

Eight new horses were purchased during the year. Several horses from the stud were exhibited at local carnivals, prizes being obtained in four cases.

Mr. Harold Burrow is to be congratulated on the very exhaustive and competent report which he has issued in connection with the veterinary work of the Corporation of Birkenhead. The report indicates that he is a very keen municipal officer, well experienced in every branch of his work and shows tireless energy in conscientiously carrying out the veterinary work for his Borough.

The information contained in the report should prove of valuable assistance to other municipal veterinary officers. B. D.

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[**Research Defence Society.** Annual Report of Committee, 1931-32.]

Elsewhere in this issue is given an abstract of the lecture delivered before the Research Defence Society by Sir Arthur Keith, which constitutes a most valuable supplement to this report as a source of reference concerning its aims and activities, which have an outstanding claim upon the interest and support of members of the veterinary profession. All of these will be aware of the grievous loss which the Research Defence Society sustained last year by the passing of Lord Knutsford, and the Report opens with an eloquent tribute to his labours on behalf of the Society, of which he was Chairman since its foundation in 1908. A staunch defender of research workers against those who sought to prejudice public and Parliamentary opinion against them, Lord Knutsford, in point of fact, promoted medical research in many branches by enlisting the financial support and sympathy of benefactors. "His last work for the Society and for research," states the Report, "was to attend the Annual General Meeting of the R.S.P.C.A., and we have good reason to believe that, by his sympathy and understanding, he materially helped to save that great Society from self-destruction at the hands of its anti-vivisection members."

Lord Knutsford is succeeded as Chairman by the Hon. Sir Arthur Stanley, while the office of Vice-Chairman, formerly held by the Society's founder, Mr. Stephen Paget, has been accepted by Professor A. V. Hill.

Of paramount interest among the activities of the Society during the year was the successful endeavour made to secure a reversal by the Court of Appeal of a decision of a lower court which had upheld the Will of the late Mrs. Martha Grove-Grady, who left her residuary estate, amounting to approximately £25,000, to found and endow a new anti-vivisection organisation. "If this bequest had been held to be charitable a slur would have been cast on medical and veterinary progress by research and on institutions registered under the Act of 1876, for the conditions she laid down even precluded the R.S.P.C.A. from accepting any of her money because it could not be said that all members of the governing body of that Society were confirmed anti-vivisectionists." As will be remembered, the House of Lords ruled that £25,000 out of the residuary estate should be devoted to the benefit of animals, provided that none of the money was used for anti-vivisection propaganda, and the profession has cause to be grateful to the Research Defence Society for the plea it put forward that this sum should be given to the Royal Veterinary College, with the gratifying result that it was allocated to that institution for the purposes of building and endowing an Animals' Hospital.

W. B.

Great Age in the Horse

"The interesting article on 'Old Horses' which appeared in the *Veterinary Record* a few weeks ago, induces me to record a case of an old skewbald cob 'Circus,' who died last December, aged forty-six," writes Mr. V. E. Pratt, M.R.C.V.S., of Redditch.

"The cob was the property of a Miss Mahony, of Hopwood, near Birmingham, and came into her possession on the death of her father about seven years ago. This cob was bought by Mr. Mahony as a two-year-old, and he was three when he began to work, which consisted in pulling a float from Hopwood to Birmingham (a distance of ten miles) and delivering goods. He was at work regularly until 1918, when he was pensioned off at the age of thirty-two. Since that year until his death he occupied the same field winter and summer. He had a comfortable shed, well littered and dry, and was fed twice daily in the winter, once daily in the summer, on a feed consisting of oats, bran and chaff. His feet were regularly attended to by the blacksmith.

I saw him last summer and noticed he was able to graze the long grass. I examined his mouth and found the incisor teeth to be missing, several of the molars broken and the remainder only to be described as "shear." He was very stiff in his joints and white about the head; his general condition was good.

I believe he became very emaciated and died quite suddenly in his forty-sixth year.

* * * * *

A further worthy addition to our recently-compiled record of horses which have attained exceptional age is noted in the *Meat Trades Journal* of June 9th, which publishes a photograph of "Royal George," a cob now 37 years old. This animal, which has been "a true and faithful servant" of Mr. W. H. Shepperd, of Barnet, butcher, for over 33 years, has never required veterinary attention, except for the filing of the teeth. It is now, of course, "pensioned off."

Abstracts

[Some Aspects of the Modern Conflict between Sentiment and Reason. Keith, Sir Arthur. Stephen Paget Memorial Lecture, given to the Research Defence Society, at the London School of Hygiene and Tropical Medicine, June 15th, 1932.]

This is the sixth of the annual lectures delivered in honour of the memory of the "sensitive and highly-cultured man"—as Sir Arthur Keith so justly describes him—who founded the Research Defence Society in the year 1908. Stephen Paget's purpose in so doing was two-fold—not only did he desire organised support for the doctrine that the relief of suffering through research constitutes a just and righteous "cause," but he felt that there was a real need for a society, such as this, to save scientific men from the cruelty of misrepresentation and injustice: "Of all forms of cruelty," says the author, "I know of none more diabolical than that which wilfully seeks to misinterpret motive."

In the fight between heart and head—the conflict between sentiment and reason—the issue at stake is nothing less than the future of civilisation, and of this vital controversy the opposition to vivisection is not an isolated manifestation but is an integral part. Amongst all highly civilised peoples there is a growing tendency for feelings to dominate reason and for sentiment, rather than intellect, to be accepted as a guide to life. If sentiment and feeling are completely to subjugate and enslave reason—as they threaten to do—then the ultimate result for civilisation will be, not progress—but disaster. "The conflict in which the members of this Society are now engaged is not merely to vindicate the right of medical men to carry out enquiries which are lawful under the Act of 1876, but also to demand that in settling all issues relating to the life and death of a community, reason as well as sentiment must have a say in the decision." Opposition to research on living animals is, then, part of a great ethical question which is forcing itself more and more on the attention of the present generation. Human nature is at least immutable in the possession of a wonderful power of rejecting facts which run counter to its feelings. If mankind were convinced by reason and by judicial and verifiable evidence, then the need for such a Society as that under whose auspices he was lecturing would have ceased long ago. Moreover, the popular criterion of "common sense"—such as was applied by Mr. Stephen Coleridge to the new conceptions of space and time promulgated by Einstein, and who, in the light of it, found them to be "nonsense"—is little more reliable than is sentiment as a guide in the solution of scientific problems. Darwin's victory was one over the common sense of his age, and when "common sense" comes against expert knowledge, retreat is the wiser policy. Secure in the possession of that knowledge, the Society must continue to produce evidence, both old and new, so as to leave no doubt in any mind that research on living animals adds to the well-being of mankind and the progress of civilisation. In this regard, Sir Arthur gives bold utterance to his own conviction, thus: "These 50 years I have been an interested spectator of the progress of medicine and I declare to all whom it may concern, that every great advance I have seen has been the result of discoveries made, not in ancient literature nor in the sick room, but in scientific laboratories—more often than not in physiological laboratories, where vivisection is necessarily practised."

The author's succeeding points are those which have happily received wide notice in the lay press, and in making them he gives in detail the circumstances which made him realise that charity intended for the relief of animal suffering may be used merely to satisfy a human prejudice, despite the fact that "one would naturally have supposed that there could not be a more practical way of bringing succour to the ailing animals of the poor than by giving liberally to veterinary institutions which offer to rich and poor alike the best that can be done by modern means of treatment." The already well-known and graphic description by Sir Arthur of his visit to the Royal Veterinary College follows, concluding with the caustic comment on those who oppose support to the College: "What worse form of cruelty can be conceived than the deliberate withholding from dumb, ailing brutes and birds the best that modern science can do for them."

This remarkably telling defence of a Defence Society and its activities concludes with a moving eulogy of the life and work of Lord Knutsford, who, only last year the "life and soul of this Society," of which he had been Chairman since its foundation, is now no more. His example as a champion of research, however, will shine as a beacon light for generations.

W. B.

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[Contribution to the Treatment of Ovine Distomatosis with "Distex Atarost." Wirz, Dr. A. *Scheiz. Archiv f. Tierhlk.* 1932. Vol. 74, No. 2.]

This paper is mainly useful for reference purposes into the position of Switzerland with regard to distomatosis and includes a detailed account of disease in the season 1930-31.

Several proprietary preparations for chemotherapeutical purposes are described, amongst

them being "distex Atarost," which, according to Bohnecamp (1929), contains ethylene chloride (25 per cent.), carbon tetrachloride (40 per cent.), liquid paraffin (35 per cent.) and male fern (0·5-1 per cent.). In practice 400 sheep were treated with distex, each animal being weighed prior to dosing with the distex in four volumes of gruel. The doses of distex were on a basis of 2 c.c. per 10 kg. body weight. The results were very satisfactory and the distex was said to kill and drive out all flukes with regularity after a single dose. Overdoses cause illness in the sheep, most commonly evidenced by irritation to the mucous membrane of the fore stomachs; therefore it is important that this preparation be used under the direct supervision of a veterinary surgeon.

J. E.

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[On the Problem of Killing Warble Fly Larvæ. Gansser, Dr. A. *Schweiz. Archiv. f. Tierhlk.* Vol. 74. No. 1.]

The author discusses the anatomy of the fourth stage warble fly larva in respect of its respiratory openings and their relation to the orifice of the cavity in the host's skin.

With reference to larvicides utilised, the chief point of importance is the power of penetration of the substance into the skin cavity and into the body of the parasite. Powerful larvicides which do not possess this quality are much less useful than weak ones which do do so. Materials that effectively seal up the orifice of the skin cavity are also valuable in killing the larvæ.

Gansser, however, believes that the best hope of success in overcoming the warble fly plague lies in systematic evacuation of the skin cavities.

J. E.

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[The Equilibrium of the Female Sexual Hormone and its Disturbances. Professor Frei. *Schweiz Arch. f. Tierhlk.* 1932. Vol. 74. No. 1.]

This is in the nature of a summary of the actual and theoretical knowledge of the physiology of the female genital system. The whole subject is complex and merits translation rather than abstraction. The more certain points are, however, set out below.

In both sexes the hypophysis is the motor of the sex glands. In the mature female it causes ripening of ovarian follicles and *corpus luteum* formation. The thyroid gland is also concerned in sexual health. Epiphysis (pineal body) and thymus are antagonistic to the above. The *corpus luteum* with its four functions—suppression of follicular ripening (œstrus), suppression of uterine contractions, preparation of the uterus for gravidity and cause of mammary hypertrophy—is antagonistic to the hypophysis and to folliculin.

Sexual normality depends on the equilibrium of these antagonistic functions and in the table below these matters are set out graphically.

The results of the various quantitative relations between hypophysis and ovary are considered at length by the author: these are obtained partly from experimental work and partly from clinical data. The author summarises this section thus: "— inactivity of the female gonads is due either to hypofunction of the hypophysis (with normal ovaries) or to lack of co-operation of the ovaries through disease (with normal hypophysis), or to anomalies in the action of both these glands. Pre-senile ovarian inactivity may have its origin in one of the three conditions (above) and may be cured either by hypophysis extract or implantation, by ovarian ditto or by a combined treatment."

Matured ovarian follicles and *corpora lutea* do not normally exist at the same time: any kind of *corpus luteum* (periodicum, graviditatis, psuedo-graviditatis, lactationis, peristens) inhabits follicular maturation. Injections of folliculin at the time of copulation prevent conception, but do not disturb an advanced pregnancy. Folliculin occurs not only in mature follicles, but also in the general ovarian tissue, so ovarian implantation has the same effect as folliculin alone.

The disturbance in function of the *corpus luteum* is referred to but not discussed here as it is considered in detail in Professor Frei's book on sterility. The action of the *corpus luteum* can be prolonged (1) by pregnancy, (2) by lactation (in rodents), (3) by pseudo-pregnancy (rabbit, ferret, dog), (4) by stimulation of the endometrium mechanically, or possibly also by the presence of bacteria, (5) by injection of hypophysis hormone, especially the B substance, or by hypophysis implantation, (6) by injections of *corpus luteum* extract or implantation. The action can be abbreviated or interrupted (1) in some cases spontaneously, probably by insufficiency of the prolan B secretion of the hypophysis (or hypersecretion of the prolan A factor), (2) by similar factors during pregnancy and pseudo-pregnancy, (3) by cessation of milk secretion (in rodents), (4) by the clearing up of an endometritis, (5) by insufficiency of the luteinising (prolan B) hormone of the hypophysis, (6) in pregnant animals by hypofunction of the maternal placenta through disease.

Note that throughout this article the anterior part of the hypophysis is under consideration. Its two main hormones are the A (follicle-ripening) and the B (luteinising) hormones.

J. E.

[See table overleaf.—Ed., *V.R.*]

DISTURBANCES IN FUNCTION OF THE SEXUAL ENDOCRINE GLANDS AND THEIR RESULTS

Gland.	(*a*) Normal Function.	(*b*) Superfunction.	(*c*) Subfunction.
1. Hypophysis (hormone A)	Normal occurrence of puberty. Normal course of œstral periodicity and pregnancy.	Precocious puberty, maturation of follicles excessive, shortening of inter-œstrum, ovarian cysts and nymphomania, S.* Ovulation and œstrum during pregnancy.	Late puberty, infantilism, prolonged inter-œstrum or anœstrum. S.*
2. Hypophysis (hormone B)	as above.	Corpus luteum formation before ovulation, persistence of the c. l., anœstrum. S.*	Shortening of inter-œstrum, no c. l. after ovulation, continuous maturation of follicles and œstrum, conception fails. S.*
3. Epiphysis (pineal body)	as above.	Late puberty, infantilism and anœstrum. S.*	Puberty (sexual maturity) long before power of reproduction [?].
4. Ovarian follicle	Normal œstrum, development of endometrium and secretion of uterine glands, uterine contractions in œstrum, cornification of vagina.	Hyperœstrum and 'heat' hæmorrhages (?), if persistent—O.† Nymphomania. S.* With 1lb. no interruption of pregnancy. S.*	No (S.)* or quiet œstrum. O.† Insufficient development of endometrium. S.*
5. Corpus luteum periodicum	Normal œstral intervals, development of endometrium, uterine contractions only during œstrum.	Prolonged inter-œstrum to anœstrum —2b. S.*	Shortened inter-œstrum to continuous œstrum. (1b. and 2c. S.*) (O.).†
graviditatis	No maturation of follicles. No œstrum, normal pregnancy and mammary hypertrophy.	Delayed œstrum after parturition, normal pregnancy, weak labour (?) mammary hypertrophy.	Maturation of follicles and œstrum during pregnancy (abortion), imperfect development and condition of endometrium. S.* Uterine contraction during pregnancy (abortion), imperfect mammary hypertrophy ? O.†
persistens	No maturation of follicles, no œstrum. S.* No uterine contractions: pyometra, failed conception S.*	No maturation of follicles, no œstrum. S.* No uterine contractions: pyometra, failed conception. S.*	Maturation of follicles, uterine contractions. O.† No pyometra failure in conception. S.*

*S=the abnormality causes sterility. †O=oophoritis.

CATTLE DISEASE MISCONCEPTIONS

Objection was taken at a recent meeting of the Herefordshire Diseases of Animals Committee to a practice which has become common in some parts of the country of describing a disease which has been prevalent in cattle this year as "Herefordshire Disease."

Mr. J. W. Hewitt said it was generally called "Herefordshire Disease" in most places. That was one of the most unfortunate things about the matter. It was entirely wrong, and he thought they could not impress that fact too much.

Mr. J. R. Barker suggested that the name "convulsions in cattle" might be adopted. The trouble was no more than a recurrence of what they had had in previous years, and it was in fact recorded all over the country, being no more restricted to Herefordshire than, for example, Oxfordshire or Aberdeen. It was owing to a change in the character of the grass last year that as a result of the atmospheric conditions, which led to a deficiency of phosphorus and calcium, and later to a lack of that sunshine necessary for the translation of the phosphorus into the blood stream. This led to convulsion, at times of particular stress in the animal's lives. The cases were nothing more nor less than convulsions in cattle, and to a certain extent could be prevented and to a great extent treated and cured.

Review

"HELMINTHOLOGICAL ABSTRACTS"

The recent creation of a separate table in Parasitology in the Royal College of Veterinary Surgeons' Examination has served to focus attention on the growing importance of this subject in connection with disease in animals. A knowledge of its development is essential for everyone who wishes to keep up-to-date; and this need is supplied partly by text-books and partly by abstracts and annotations. Protozoology and Entomology are fairly adequately dealt with under both these headings, but Helminthology—which is by far the most important of the three branches of Parasitology to the veterinary surgeon in this country—has only recently come under systematic consideration.

The most important step yet taken is the appearance of a new abstracting journal with the title of "Helminthological Abstracts," edited by Professor Leiper with the co-operation of Dr. Peters, Miss Triffitt and Dr. T. W. M. Cameron, M.R.C.V.S. This new journal proposes to abstract every article on Helminthology which appears in any journal and in any language. It will be issued in five parts each year, the first part in April and the fifth in the spring of the following year so that each volume when bound will contain a complete account of all papers on the subject which have been printed during the twelve-months. It is compiled on a new and unusual plan. The abstracts are arranged by journals, not by subject matter, in order that the reader may see clearly, before visiting a library to glance over the current periodicals, what papers of helminthological interest he will find and whether these will be of importance to him or not. Further, each abstract has the first few lines double spaced, the double-spaced portion being in effect an extended title and the remainder a succinct abstract of the chief results obtained by the authors. This will further economise time and effort and will give the busy worker a clear and early bird's-eye view of what is happening in the subject.

The journal should be invaluable not only to the isolated veterinary surgeon in the tropics but to the busy practitioner. This value is enhanced by the cheapness of the review. It costs only 16s. 6d. per year (post free) from the Institute of Agricultural Parasitology, Hatfield Road, St. Albans.

The Pathology Department at the Rowett Research Institute, Aberdeen, has been closed down for economy reasons, since there is now operating at Edinburgh the Animal Diseases Research Association.

N.V.M.A. Divisional Report

CENTRAL VETERINARY SOCIETY

DISTEMPER PROPHYLAXIS DISCUSSED AT RED LION SQUARE

Having had twelve months' further experience with the various methods of distemper immunisation and the use of the respective products since he last addressed the Fellows of the Central Veterinary Society on the subject, Major T. Dalling favoured his colleagues with a much-appreciated dissertation upon it at a well-attended meeting held at 10, Red Lion Square, W.C.1, on the evening of Thursday, June 2nd, 1932.

[Readers are referred to the commencement of this issue for the paper and for a full report of the prolonged discussion to which it gave rise.—Ed. *V.R.*]

The President of the Society, Major Hamilton Kirk, occupied the chair, and there were also present Captain L. S. Balls, Captain J. Bell, Mr. W. Brown, Captain G. N. Bushman, Mr. H. E. Bywater, Mr. J. C. Coleman, Mr. A. Cornish-Bowden, Major T. Dalling, Major W. Denington, Major G. W. Dunkin, Dr. J. T. Edwards, Mr. P. S. Howard, Mr. Herbert King, Mr. H. C. P. King, Professor James Macqueen, Dr. James McCunn, Mr. K. Ollerhead, Mr. W. Perryman, Major F. S. Probyn, Major R. T. Smith, Mr. F. H. Stainton, Miss Marian Stewart, Major F. J. Taylor, Captain W. K. Townson, Mr. R. A. Willett, Mr. C. E. Woodrow, Professor G. H. Wooldridge and the Hon. Secretary (Captain J. F. Macdonald), together with the following visitors: Dr. R. A. O'Brien, Dr. R. D. Macintosh, and Messrs. J. M. Laing and A. B. MacIntyre.

At the outset of the proceedings the President extended a cordial welcome to the visitors, making special reference to Dr. Macintosh, a graduate of the Veterinary School at Toronto, and Dr. O'Brien, of Messrs. Burroughs Wellcome and Co.

The minutes of the April meeting of the Society, having received publication in the *Record*, were taken as read and were confirmed.

Apologies for absence were announced from Lieut.-Colonel E. P. Argyll, Dr. F. Bullock, Mr. G. N. Gould, junr., Principal F. T. G. Hobday, Dr. P. P. Laidlaw, Mr. G. H. Livesey, Mr. G. P. Male, Major Eustace Montgomery, Captain S. H. Motton and Mr. H. L. Roberts.

Greetings from the "Mid-West."—The President now announced that he had a message to deliver. When he was privileged to attend a meeting of the Mid-West and South Wales V.M.A. at Bath, a fortnight previously, the President and Fellows of that Society requested him to convey their good wishes to the Fellows of the "Central," and, with much

pleasure, he undertook to do so. (Applause.)

Next Meeting. — Continuing, the President observed that for some time past he had contemplated the possibility of the Society visiting the Gardens of the Zoological Society for their summer meeting. He had mentioned the matter to Professor Wooldridge, who had undertaken to approach Sir Peter Chalmers Mitchell, the Secretary of the Gardens. In consequence, a letter had been received from Sir Peter, suggesting July 7th as the date of a visit from the Society, which would be welcomed, and for which a room would be available for the Fellows in connection with their visit to the Gardens.

Major Taylor expressed warm approval of the projected visit, saying that he had a recollection of a most enjoyable meeting held at the Gardens by the Society a few years ago.

Captain Townson proposed accordingly, Captain Dunlop Martin seconding.

It was further agreed, on the proposition of Major Dunkin, that a short paper be read, the choice of author and subject to be left in the hands of the President and the Hon. Secretary. July 7th was eventually decided upon as the date, and it was understood that the presence of ladies will be welcomed.

There being no morbid specimens, the meeting proceeded to elect Mr. K. Everett, of Northam Lodge, Sutton, Surrey, as a Fellow—on the proposition of Mr. R. Scott, seconded by Dr. J. McCunn.

Representatives to Council, N.V.M.A.—The President, Principal F. Hobday, Professor J. Macqueen, Dr. McCunn, Captain Townson, Mr. R. A. Willett and Professor J. G. Wright were re-elected in this capacity, with the Hon. Secretary *ex-officio*.

Captain W. K. Townson, speaking at this point as one of the Society's representatives on the Council of the N.V.M.A., said that he desired to put the question to the meeting as to whether the Council of the "National" should be asked to undertake the rôle of prosecutor in the event of any case occurring in the district of any of their members of breaches of by-law 53—*e.g.*, advertising. He felt that it was very hard for a local man to have to lay information before the Royal College of Veterinary Surgeons against anyone in his district. When a member had what he deemed to be clear evidence of such a breach of the by-law, he (Captain Townson) thought that it should be laid in confidence before the N.V.M.A., and the "National" should take the case up for them as members of that body.

The President expressed the view that Captain Townson's suggestion represented a much more equitable way of doing things than the existing practice. He understood that Captain Townson wanted to know if the Society would like him to bring up that matter at the next Quarterly Meeting of Council, N.V.M.A. It meant that it would have to go on the agenda of that meeting.

Captain Townson moved a resolution in the following terms: "That this Division recommends that the National Veterinary Medical Association should collect evidence, lay information and be complainants on behalf of any member of the Association who desires to lay a charge of advertising or other misdemeanour against a fellow member of the profession."

The proposition was seconded by Mr. R. A. Willett, and, after some discussion, carried.

Paper.—The President now called upon Major Dalling to read his paper, entitled "Observations on Canine Distemper Prophylaxis."

The discussion was opened by Mr. F. H. Stainton, and at the conclusion of the essayist's reply, the President, in expressing the thanks of the Society to Major Dalling, said that they had listened to a most instructive and interesting paper from an authoritative source. It had provoked a most excellent discussion and he had no doubt they would accord Major Dalling that expression of their hearty appreciation which he richly deserved. (Applause.)

The vote of thanks was passed with acclamation.

Any Other Business.—Mr. R. A. Willett put forward the proposal that a meeting of the Central Veterinary Society be arranged in connection with the 1933 Bath and West Show, which was to be held at Wimbledon—he understood during the last week in May. A good opportunity would thereby be provided the Fellows of the "Central" for meeting their colleagues from the West, who customarily had a meeting associated with the show.

The President thanked Mr. Willett for his suggestion and promised that it would be borne in mind.

The meeting concluded with an acknowledgment of the President's services in the chair.

J. F. Macdonald, *Hon. Secretary.*

I have heard from South America of a case in which 10,000 sheep were given, without any price at all, to one of the large meat concerns, merely for the taking, because the farmers there could not afford to keep them alive. What is to be done in face of competition of that sort?—*Major Braithwaite, M.P.*

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A party of two hundred farmers from the West of Scotland, who visited the Crichton Royal Institution Farm at Dumfries, where one of the largest herd of pigs in Scotland is bred, saw a novelty in the form of a bathing pool in which pigs may rest in comfort in warm weather. The pool, measuring about 30 feet by 15 feet, is built of concrete, with gently sloping sides. The farm manager, Mr. W. J. Will, stated that on a hot sunny day as many as twenty large sows may be seen enjoying the refreshing influences of the pool.

In Parliament

DEPARTMENT OF AGRICULTURE, SCOTLAND

Results of Animal Disease Research

In the House of Commons on Wednesday, June 2nd (House in Committee of Supply), on the Vote to complete the sum of £336,647 for salaries and expenses of the Department of Agriculture for Scotland, Sir A. Sinclair, Secretary of State, for Scotland, referred to the "new and valuable service" recently inaugurated by an Act of the last Parliament—the inspectorate appointed under the Licensing of Bulls Act. For that purpose two inspectors and one part-time advisory officer had been appointed at a total salary of £754.

Turning to the subject of agricultural research and education, Sir Archibald said (in the course of his remarks):—

"There is no more profitable investment that the State can make than scientific research. It is proving its value to agriculture in directions too numerous to mention to-night, but of which recent and striking examples are the prevention of rickets in pigs, of disease in chickens, and particularly chickens hatched in winter and early spring, and of diseases in sheep which have inflicted heavy losses on Scottish flockmasters. It may be asserted with every assurance that investments in agricultural research return, not five or ten, but hundreds per cent. on the capital invested.

"An important feature of the work of the institutes in recent years has been the co-operation between a number of institutes, each pursuing the particular line of research for which it is specially adapted, but working towards a common goal. For example, an investigation into the relation between deficiency in the mineral constituents of soils and the occurrence of disease due to malnutrition is being undertaken by the Macaulay Institute for Soil Research, aided by the Rowett Institute for Animal Nutrition at Aberdeen, and the Animal Diseases Research Association at Edinburgh. Each of these Institutes approaches the problem from its own special angle, and facilitates the progress towards the common goal of its fellow institutes.

"Another example of team procedure is the research which is being carried out on the nutrition of pigs, in which the Rowett Institute, again, is collaborating with the Animal Diseases Research Association in Edinburgh and the Animal Breeding Research Department of the University of Edinburgh. The results of this work should be of immense practical value to farmers in Scotland, and should greatly facilitate the development of the Government's policy for the encouragement of the pig industry. I hesitate to detain the Committee any further on this subject, but there have been such remarkable developments in research on the diseases of sheep that I think the Committee would like to be informed about them. Under the auspices of the Animal Diseases Research Association, during the past year over 30,000 doses of vaccine for inoculation against braxy were sold by the Association to farmers throughout the country, and it is a striking testimony to the efficacy of this treatment that, while in the untreated animals on the farms where carefully controlled large scale experiments were conducted the death rate from braxy ranged from five per cent. in some lots to 14 per cent. in others, the death rate from the disease among the treated sheep was only one-half of 1 per cent.

"Still more important and gratifying were the results of the issue by the Association of 50,000 doses of serum for the treatment of lamb dysentery. The treatment was entirely successful, and I think the Committee will agree that this is an achievement which only a few years ago would have seemed almost visionary, but which will put scores of thousands of pounds every year into the pockets of sheep farmers in Scotland; and I think the Committee will also agree that the grateful congratulations of us all are due to Dr. Russell Grieg and the brilliant staff of the Animal Diseases Research Association. A vaccine for the treatment of louping-ill has also been prepared by the Association, and has been tried this season upon 4,000 sheep. Strong grounds exist for anticipating favourable results, and the preliminary reports, which I only saw yesterday, indicate that the experiments are being conducted under good conditions, and are yielding promising results so far.

"I must also refer briefly to the work which is being undertaken by the Hannah Dairy Research Institute. This work is of great value to milk producers, and also to the general community. There is no more important branch of agriculture than the dairy industry, nor one with greater possibilities of expansion. It has been estimated that the average consumption of milk per head of the population in this country is less than half a pint per day; yet, if the average consumption per head in Scotland were raised by a quarter of a pint per day, we should need 100,000 more cows and 10,000 more workers on the land to look after them. Even then the average consumption of milk in Scotland would be about half that in Sweden, and only three-fifths of that in the United States of America. If we increased our consumption to the level of that in Sweden, it is doubtful if, under the present conditions of agriculture in Scotland, there would be enough land in the whole of Scotland to carry the cows that would be required.

"The supreme importance of milk as a food, and especially as a food for growing children, has been demonstrated by a series of experiments carried out in different parts of the country, notably that which was undertaken by the Lanarkshire Education Authority in 1930. But, if the industry is to be developed to its full capacity, it must be enabled, on the one hand, to banish from the public mind the fear of unclean milk and, on the other hand, to lower its cost of production by attacking diseases such as tuberculosis, contagious abortion and mastitis. The Hannah Research Institute and the Animal Diseases Research Association are already working on the eradication of tuberculosis and the prevention of milk fever, and we are now laying our plans for attacking other diseases which impose heavy charges on milk producers. All this work is an important part of the Government policy for the encouragement of the great dairying industry.

"The importance of research is great, but no less important is it to convey the results of research to the farmers. The first stage is the pure research in the laboratory. The next stage is experiment on the farm attached to the Institute. Then experiments on a larger scale may be carried out by the agricultural college, and finally, when the value of the experiment is proved, it is the duty of the colleges, by means of arranging visits to farmers, to see the results of the experiments and, by any other means in their power of which, of course, the chief is the employment of the county organiser, to get that information to the farmers of the country."

The following questions and answers have been recorded in the House of Commons recently:—

MINISTRY OF AGRICULTURE

Captain Peter Macdonald asked the Minister of Agriculture what proportion of the expenditure of the Ministry of Agriculture was allocated to salaries and travelling expenses of officials in 1931 and 1921, respectively?

Sir J. Gilmour: Salaries and travelling expenses of officials, excluding industrial staff and officers paid by fees, accounted for 19·2 per cent. of the Ministry's expenditure in 1921 and for 20·9 per cent. in 1931. In 1921, the Ministry's expenditure included substantial sums in respect of war-time services and abnormally large sums in respect of foot-and-mouth disease, of which the cost of officials formed a relatively small proportion.

HORSES (EXPORT)

Mr. Macquisten asked the Minister of Agriculture whether he has considered the copy sent to him of a memorandum by the International League against the export of horses for butchery, which shows that the majority of horses certified at British ports for export are horses whose days of labour it is not considered either decent or humane to prolong over here; and whether he will take steps to prevent the export of such horses?

Sir J. Gilmour: I have read the memorandum referred to. The statement contained therein to the effect mentioned by my hon. and learned Friend is not correct. The standard of fitness which has been adopted at British ports for many years is such that no horses are passed for shipment which are in such a physical condition that they are not capable of working without suffering. The last part of the question does not, therefore, arise.

Mr. Macquisten: Is there no way of "choking off" these collecting societies from advertising themselves by publishing these incorrect statements?

Lieut.-Colonel Moore: Would not my right hon. Friend consider this point, that it might be more proper to define more accurately the types of horses which can be exported under the existing Statutes; and would he not also consider the fact that there are horses at present exported which are capable of working but which undergo a considerable amount of suffering in being transported to that work across the Channel?

Sir J. Gilmour: The investigations made by the Departmental Committee which inquired into this traffic in 1925 showed that a considerable proportion even of the horses which were rejected were returned to work in this country.

Mr. Godfrey Nicholson: Does my right hon. Friend consider the present state of affairs to be satisfactory or not?

Sir J. Gilmour: As far as our administration is concerned, I believe the position to be satisfactory.

HORSES (PALESTINE)

Lieut.-Colonel Moore asked the Financial Secretary to the War Office if he can state the number of Army horses that were cast and sold or otherwise disposed of in Palestine at the conclusion of hostilities; the amount realised; and the estimated number still alive?

The Financial Secretary to the War Office (Mr. Duff Cooper): No, Sir. Separate returns were not rendered for Palestine. The numbers were included in the figures for Egypt, for which I would refer my hon. and gallant Friend to the answer which I gave to my hon. and gallant Friend the Member for Salisbury (Major Despencer-Robertson) on May 10th.

Lieut.-Colonel Moore: Is the Financial Secretary aware that on that occasion no figures were given as to the amount realised for the sale of those stores?

Mr. Cooper: They were not asked for on that occasion.

Mr. Cooper: I will send them to my hon. and gallant Friend.

CATTLE DISEASE, LECHLADE

Mr. T. Williams asked the Minister of Agriculture if his attention has been drawn to the losses among cows in Lechlade following an illness whose nature is not yet known; and whether his Department is making inquiries?

Captain Sir George Bowyer (Lord of the Treasury): I have been asked to reply. My right hon. Friend's attention has been drawn to the losses referred to, and inquiries by veterinary officers of the Ministry confirm the views of the local veterinary practitioners that the disease is due to an acute mineral deficiency associated with lactation and parturition in cows. The disease is well known to veterinary surgeons in Great Britain and Western Europe, and my right hon. Friend is advised that it can be successfully treated if treatment is adopted on the earliest appearance of symptoms.

Death of Professor Bernard Bang

We are deeply indebted to a personal friend of the late Professor Bang for the following notice:—

"Professor Bernard Bang, whose death occurred at Copenhagen at the age of 84 on the 22nd ult., had, for many years, been regarded throughout the world as one who had contributed greatly—perhaps more than any of his strict contemporaries—to the advancement of veterinary science. His name in veterinary, medical and agricultural circles long ago became almost a household word in connection with tuberculosis, first through his researches regarding the disease in the mammary gland of the cow, and later by his study of the prophylaxis and eradication of bovine tuberculosis.

"His next great achievement was the discovery (along with Stribolt) of the germ of contagious abortion in cows, which formed the starting point of all the progress that has since been made in knowledge regarding the prevention of the disease. Other diseases regarding which he conducted valuable researches were, actinomycosis, bacillary necrosis, swine fever, swine erysipelas, and Johne's disease.

"All Bang's researches were characterised by originality and painstaking thoroughness, and his writings by lucidity and logicality.

"As all who knew him will testify, he was, by nature, one of the most modest of men. He was nowhere held in higher esteem than in this country. In 1901 he was elected Honorary Associate of the Royal College of Veterinary Surgeons, and he was the recipient of many similar honours in other countries.

(*Continued in next column.*)

"His great achievements in veterinary research shed lustre on the Copenhagen School, of which he was so long an ornament, but the benefits of his labours were world wide. His life provides an example and a stimulus to the younger members of the profession in all countries."

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It may be added that the Honorary Life Membership of the International Veterinary Congresses was conferred on Professor Bang at the London Congress in 1930. Representing as it does the collected opinion of the veterinarians of the whole world, this signal honour may be said to be the highest tribute that can be paid to any member of our profession.

It is also fitting, we think, that we should reproduce here the following extract from the *Veterinary Journal*, July, 1928.

PROFESSOR Dr. BANG'S 80th BIRTHDAY

"(Our congratulations to Professor Bang, of Denmark, formerly Principal of the Copenhagen Veterinary School, on having attained his 80th birthday, and a sincere wish from his English colleagues that he may be spared and enjoy good health for many years to come.)

"The festivities were carried out in brilliant sunshine, and were of a most cheerful and successful nature.

"Dr. Bang, surrounded by his family, received endless congratulations from friends and colleagues far and near; together with letters, telegrams, flowers and gifts of various kinds. Many students from colleges and institutions came in person to bring their good wishes.

"Prince Valdemar and several Ministers of State sent telegrams; Professor Ellinger, Director of the High School, was present, and Professor Martin Knudsen, Rector of the University, brought congratulations from his students and from the various scientific societies. The Medical Faculty was represented by the Physician-in-Chief, Dr. Olaf Thomsen; The Medical Society and Finsen Light Institute by Dr. Reyn; the State Serum Institute by Dr. Thomas Madsen; and the Carlsberg Laboratory by Professor S. P. L. Sörensen.

"Members of the Veterinary Council, together with their Secretary, were present, and Veterinary Sanitary Inspector, Dr. C. O. Jensen, offered the aged President good wishes on behalf of the members and employees of the Council.

"Staff Veterinary Surgeon Dr. St. Friis brought good wishes in the name of the Army Veterinary Corps. A committee, under the Presidency of Dr. Paulli, carried out a short programme, arranged in honour of the day, with the assistance of the masters, assistant masters and former pupils of the High School.

"The Danish Veterinary Society, with their President, Dr. G.. Gautier, as spokesman, offered a tribute of lovely flowers to Dr. Bang. The Veterinary Surgeons of Zeeland were separately represented by V. Sr. Gram, who presented in their name a gift, accompanied by beautiful flowers. Finally, we may mention the greetings of the Soran Society, conferred by Staff Surgeon Dr. Norrie; and a number of personal good wishes from Dr. Bang's own colleagues.

"Professor Hedelin, from Alnarp, brought an address of congratulation from the Swedish Veterinary Association; and District Veterinarian Borg, as representing the Skanien Veterinary Association, brought a beautiful tribute of flowers.

"Professor von Ostertag brought congratulations from the German Veterinary Surgeons, and presented Dr. Bang with a Diploma, creating him an Honorary Member of the Würtemburg Veterinary Society, together with an address from the Professors on the staff of the Berlin High School.

Professor Poppe, from Rostock, conveyed the greetings of the Veterinary Society of Mecklenburg.

"Dr. Bang had invited as many of his relations and friends as his house would contain to a dinner party in the evening; and it was late on into the night when the octogenarian received the last of the many speeches and tokens of goodwill sent him from the crowds of well-wishers.

"All who were present that evening will remember the cheerful, wonderful feast and the aged, clear-minded, Professor who acknowledged, in so bright and happy a spirit, all the homage so generously offered him on his 80th birthday."

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

DIARY OF EVENTS

July 2nd.—Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne.

July 4th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

July 6th.—R.C.V.S. Summer Examinations begin.

July 7th.—Meeting of the Central Division, N.V.M.A., at the Zoological Gardens, Regent's Park, N.W.1.

July 7th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Keswick.

July 12th.—Meeting of the Derbyshire Division, N.V.M.A., at Derby.

July 15th.—Summer Meeting of the Eastern Counties Division, N.V.M.A., at Great Yarmouth.

July 22nd.—Summer Meeting of the Lancashire Division, N.V.M.A., at the Harper Adams Agricultural College, Newport, Shropshire.

Aug. 8th-13th.—N.V.M.A. Jubilee Congress at Folkestone.

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Royal Army Veterinary Corps

MAJOR-GENERAL SIR JOHN MOORE
COLONEL COMMANDANT

The King has approved of the appointment of Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S., retired pay, as Colonel Commandant, Royal Army Veterinary Corps, in succession to Major-General Sir Layton J. Blenkinsop, K.C.B., D.S.O., retired pay.

Major-General Sir John Moore, who is 68, has had a distinguished career in Army veterinary work, being Director of the service in France from 1914 to 1918, and was given a knighthood and promotion to major-general. This work was continued in India up to 1921 as Director. His

earlier war service had been in the Sudan and South Africa. Recently he has taken an active part in the raising of funds for the development of veterinary science and treatment in civil life. He retired from the Army in 1921.

Sir John, as is well known to our readers, has rendered yeoman service to the N.V.M.A., over an extended period, as Chairman of the Editorial Committee, and all will join with us in congratulating him upon his most recent distinction.

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Personal

DR. T. W. M. CAMERON'S APPOINTMENT IN CANADA

Director of Empire Centre for the Study of Internal Parasites

In a recent issue we drew attention to the establishment, in Canada, with the assistance of a grant from the Empire Marketing Board, of a new Empire Centre for the scientific study of internal parasites. New buildings, which will house the Institute of Parasitology, have been erected by the Quebec Government at Macdonald College, the agricultural college attached to M'Gill University. The undertaking marks the first occasion on which the Canadian Government and the Empire Marketing Board have combined to support a joint scheme of research.

It is a matter of very hearty congratulation, not only to the holder of the appointment himself, but to the veterinary profession, that our esteemed colleague Thomas Wright Moir Cameron, M.A., D.S.C. (EDIN.), PH.D. (EDIN.), M.R.C.V.S., of the Department of Zoology, University of Edinburgh, should have been selected to direct the research to be conducted at this important centre. The thought uppermost in the minds of all who have the privilege of knowing Dr. Cameron, however, will be that congratulations are also to be extended to those responsible for his appointment and to those who will have the opportunity of working in association with him when, in September next, he officiates in the dual capacity of Professor of Helminthology at McGill University and Director of the Institute of Animal Parasitology, which is situated at Macdonald College—the agricultural faculty of the University. By his host of friends in Edinburgh, and far beyond the confines of that city, Dr. Cameron's genial and helpful personality will be sorely missed, though the sense of the loss sustained by the Department of Helminthology of the University will be mitigated by the knowledge that the services of its brilliant Director are to have the Empire-wide range merited by his capabilities and temperament. The study of parasitology, particularly in its veterinary aspect, has had no more devoted adherent than the man who, at the early age of 38 years, has achieved the very high degree of distinction indicated by his selection for this new and supremely important appointment.

Born at Glasgow, in 1894, the eldest son of Hugh Cameron, of Edinburgh, Dr. Cameron was educated at Allan Glen's School, Glasgow; Glasgow, London and Edinburgh Universities, and Royal (Dick) Veterinary College. His academic career was a distinguished one, he being a Research Scholar of Edinburgh University, and Ministry of Agriculture Research Scholar, 1921-23; thereafter he became Senior Research Assistant, Institute of Agricultural Parasitology, London, 1923-25, and Lecturer and Milner Fellow in the Department of Helminthology, London School of Hygiene and Tropical Medicine, 1925-1929.

Dr. Cameron received his commission in the Highland Light Infantry, 1914-16, and the further details of his military career are as follows:—R.A.F., 1916-19; Royal (Dick) Veterinary Contingent O.T.C., 1921-23; Major R.A.V.C. (T.A.) (2nd London Division).

During his sojourn in the South, Dr. Cameron officiated as Secretary, Section of Tropical Diseases and Parasitology, and as Vice-President, Section of Comparative Medicine, Royal Society of Medicine, 1926-1929. In the following year Dr. Cameron was appointed Lecturer in Helminthology at the University of Edinburgh and at the Royal (Dick) Veterinary College, when he was elected to the Secretaryship of the Edinburgh Branch of the Royal Society of Tropical Medicine and Hygiene.

A valued contributor on Veterinary Diseases to the Bulletin of Hygiene, he has published a well-known work "Animal Diseases in Relation to Man," and numerous papers on this subject and on parasitic helminths of animals.

Elsewhere in this issue our notice of "Helminthological Abstracts" draws attention to a most valuable addition to parasitological literature, collaboration in the foundation of which represents the most recent phase of Dr. Cameron's continuous endeavour to promote the interests of his science and its devotees, and we are glad to learn that his association with this publication is to continue.

It is also to be noted with satisfaction that Dr. Cameron's pending departure for Canada will not preclude the fulfilment of his duties as Secretary of the Comparative Medicine Section of the British Medical Association Centenary Meeting to be held in London at the end of this month.

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PRESENTATION TO MR. F. SOMERS, M.R.C.V.S.

On the occasion of the annual conference of the National Master Farriers' and Blacksmiths' Association, held at Cardiff at the beginning of last month, Mr. F. Somers was presented with a Gold Medal as an appreciation of his twenty-five years' service as Veterinary Surgeon to the Association.

The President of the Association, Mr. A. Elstrop, in making the presentation, made reference to the "yeoman service rendered by Mr. Somers to the Association in a professional capacity." Mr. Somers had been associated with that organisation since its inception, and that gold medal was bestowed as a memento of the sterling work he had done. They were glad to see him in such robust health after so many years of valuable activity on their behalf.

Mr. Somers, in acknowledging the gift, said that he considered it a token of the good feeling that had existed between them for twenty-five years and as a recognition of the services rendered by him in "cases of law" all over the country from Cornwall to the North of Scotland and Carnarvon to Hull. He had done his best for them and he had been assisted by their own officials. They had won most of their cases in those years.

The education of the farrier had greatly improved in recent years, and the status both of the Association and of the farrier had never been so high as it was to-day: they had advanced in the eyes of the public generally. During the first years they could not have had a gathering of that kind under any circumstances. Twenty-five years ago their membership was 16, now it was over 6,000.

Regarding his position generally as Examiner for the Worshipful Company of Farriers for all Degrees, he could safely say he had never known men so well up in all the details of the technical work appertaining to the farrier. That was due to

more able and clever instructors. One could always tell by the examination of a class whether the Instructor was a good one. Honours had been given all over the country, and most excellent results had been attained all round. The craftsmanship of shoeing to-day was better than ever before.

In a reference to the farriers' literature, Mr. Somers observed that at present it was all on the veterinary side, but they wanted literature of their own, and some of those present were well qualified to make good the deficiency.

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Mr. J. A. Griffiths, F.R.C.V.S., Deputy Chief Veterinary Officer, Nigeria, West Africa, has embarked for Nigeria on termination of his leave in England.

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Mr. James A. Bradley, M.R.C.V.S., of Londonderry, has been appointed Resident Veterinary Surgeon to Ulster S.P.C.A. Hospital, Whiteabbey, Co. Antrim.

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The Royal Veterinary College will receive the reversion of a £1,000 bequest left by Mr. Alexander William Seton, of Astley Avenue, Cricklewood, N.W., a merchant, who left £21,730.

He also left £5,000 to revert eventually to eight animal charities.

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It is regretted that the name of Major Hamilton Kirk was inadvertently omitted from the list of attenders forwarded to us for inclusion in our report of the Annual General Meeting of the Royal College of Veterinary Surgeons, published in last week's issue.

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R.C.V.S. OBITUARY

Glass, Robert. 317, Cumberland Street, Glasgow. Graduated Glasgow, April 29th, 1881; died June 23rd, 1932, aged 79 years.

Rennie, Thomas. Lyndhurst, Silverdale Road, Burgess Hill, Sussex. Graduated Glasgow, December 18th, 1897; died June 15th, 1932.

In reference to the late Major Rennie, the *Mid-Sussex Times* says: Mr. Rennie had an eventful career. As a young man, he served in the Gunners throughout the Boer War. Later, he joined the Veterinary Department of the Government of Burma, and after some 25 years' service ended as Superintendent of that department and agricultural adviser to the Government of Burma. During the time he was in Burma he was an officer in the Rangoon Artillery, being second in command and holding the rank of Major. During the Great War he commanded one of the forts defending the Rangoon River while the "Emden" was raiding in the Gulf of Martaban. Later in the war he was second in command of the regular Artillery there, and for a short period, in the absence of the General, commanded both Rangoon itself and the Artillery. At the conclusion of the war he resigned his rank of Major. He had been living in Burgess Hill some five or six years, and he died in the Haywards Heath Hospital at the age of 55. He leaves a widow and five children to mourn their loss. The funeral took place on June 17th, and a service was held at St. Andrew's Church, the Rev. G. Tindal-Atkinson (Vicar) officiating.

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MEAT INSPECTION IN SCOTLAND

In the note under the above heading in our issue of June 18th (p. 698) concerning the new regulations, governing the supply of meat, made by the Department of Health for Scotland, the date "1932" should read "1923," in reference to the prior period of seven years' experience required of persons, other than Medical Officers of Health and veterinary surgeons, qualified to act as meat inspectors under these regulations. A correspondent points out that, were it not for the relative paragraph in the regulations, the veterinary profession in Scotland would not be in so secure a position as it is in the matter of meat inspection.

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"BOON FOR ANIMALS OF THE POOR AT SCARBOROUGH"

Under the above heading, the *Scarborough Evening News* reports that the Scarborough Branch of the Royal Society for the Prevention of Cruelty to Animals has arranged for free veterinary treatment and advice to be given by a qualified veterinary surgeon to genuinely poor people.

"Mr. H. W. Good, M.R.C.V.S., has offered his services without charge in this connection, and there is much appreciation of the way in which he is supporting this scheme."

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LECTURES BY VETERINARIANS AT THE ROYAL SHOW

With the willing co-operation of the Royal Agricultural Society of England, the Southern Counties Division, N.V.M.A. have arranged a series of lectures to be given in the large Members' Tent at the Royal Show at Southampton. The programme is as follows:—

July 6th, *4 p.m.*—"Foot-and-Mouth Disease and its Control," by John L. Frood, Esq., M.R.C.V.S., Ministry of Agriculture and Fisheries. Chairman: G. P. Male, Esq., M.R.C.V.S.

July 7th, *4.30 p.m.*—"Tuberculosis and Milk," by Harold Burrow, Esq., M.R.C.V.S., D.V.S.M., Chief Veterinary Officer of Birkenhead. Chairman: His Worship the Mayor of Southampton. (Mr. Coun. Woolley).

July 8th, *4 p.m.*—"The Veterinary Profession and Your Animals," by Professor J. G. Wright, F.R.C.V.S., Royal Veterinary College, London. Chairman: Major E. S. Martin, M.R.C.V.S.

The R.A.S.E. have given considerable publicity to these lectures through the programme and posters issued in connection with the Show, and it is hoped that as many members of the profession as possible will be present to support the venture and participate in the discussions which will follow each lecture, admission to which is free.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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ROYAL SANITARY INSTITUTE CONGRESS, BRIGHTON

July 9th, to 16th, 1932.

Section F., Veterinary Hygiene

To the Editor of the Veterinary Record.

Sir,—Please may I be permitted to appeal through the medium of the *Veterinary Record* to veterinary surgeons in the South and South-East of England to attend the meetings of the Veterinary Hygiene Section at the above-mentioned Congress and thus assist in maintaining our status as an important part of public health administration in the estimation of the large number of representatives of local authorities and other important bodies who yearly attend this Congress.

The Veterinary Hygiene Section will meet on July 14th and 15th. On the first day Alderman Sir William Phené Neal, Bt., the President of the Section, will give his Presidential Address, and Major Brennan De Vine, M.C., F.R.C.V.S., D.V.S.M., will present a paper on "The Law Relating to Meat Inspection." The following day Captain R. Simpson, F.R.C.V.S., D.V.S.M., will present a paper on "The Duties of a Whole-Time County Veterinary Inspector," and Captain F. W. Medlock, M.R.C.V.S., will also present a paper on "The Supervision and Control of Milk-Producing Animals and What it Means to the Public." It is considered that the subjects provided for discussion are of great interest to veterinary surgeons and are being presented by authorities on their respective subjects, and in view of this and of the great interest shown in the advancement of the veterinary profession by Alderman Sir William Phené Neal, it is hoped that a large number of veterinary surgeons will be present to support the President and the profession and thus ensure a satisfactory meeting.

Yours faithfully,

J. A. Dixon.
Recording Secretary.

Public Health Department,
12, Market Buildings,
Vicar Lane, Leeds.
June 24th, 1932.

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"MILK FEVER"

To the Editor of the Veterinary Record.

Sir,—There is no doubt that this condition gets worse with the passing of the years, both in the number of cases and the intensity of the condition.

Thirty years ago, before this intensive and, to my mind, ridiculous feeding, cases were not so prevalent, and going down twice was exceptional and more than twice not experienced. Now, almost every case one gets goes down at least twice, and four or five times is not at all exceptional.

The modern methods of farming (due to a grandmotherly legislation) are to blame for this. Nowadays the farmer is placed between the devil of a big wage bill and the deep sea of an unremunerative price for his products; hence he takes the only course left to him and puts his land out of cultivation, lets it "go to grass," disposes of most of his labour, gives up limeing and manuring, buys all sorts of "balanced rations," goes in for milk production at about 7d. a gallon and eventually goes bankrupt.

That, in my opinion, is the origin of these bad milk fever cases, and of the many deficiency diseases which are always cropping up in one's practice: farming methods have changed and disease is changing with them.

As to calcium therapy, I think there is no doubt that giving a suitable dose of a suitable calcium salt in a suitable case, is good practice—*as an adjuvant.*

I have been in practice long enough to have gained the experience that inflation of the udder and re-inflation when necessary, is our sheet anchor in these cases.

I believe that the pressure in a well-inflated udder has a mechanical effect on the blood vessels supplying the udder and a chemical action on the milk secreting cells which retards the secretion of the milk for at least three days, and this is all to the good in counteracting the depletion of the calcium in the circulatory system and bringing about a balanced blood supply.

In my practice I use oxygen under compression, and sometimes "dextro-calcium" as an adjuvant. Of the latter I do not give more than 60 c.c. of the solution at one time, and up to the present I have had neither induration nor sloughing.

Let me give a case in point.

June 5th, 1932.—Cow down with milk fever. Inflated udder. Cow up and eating in three hours. *Hocks still straight.*

June 6th.—Went down again in the afternoon. Inflated udder. Apparently all right in about four hours. Hocks still not normal.

June 7th.—Went down again in the afternoon. Gave 60 c.c. "dextro-calcium" subcutaneously. Saw her again at 10 p.m. She was better but not able to stand, so I inflated the udder again.

June 8th, 10 *a.m.*—Cow still down and more or less comatose. Inflated the udder.

June 8th, 7 *p.m.*—Improving, but not able to stand. Gave another 60 c.c. "dextro-calcium."

June 9th, 10 *a.m.*—Cow got up during the night. *Hocks natural.*

June 9th, 7 *p.m.*—Improvement continued and cow had no further relapse, and has since done well.

Yours faithfully,

J. W. Hall Masheter.

Ruddle House,
Newnham-on-Severn.
June 27th, 1932.

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To the Editor of the Veterinary Record.

Sir,—We seem to be living in an age of calcium deficiency as far as the causation of disease in the cow is concerned. It seems that practically all diseases associated with disturbance of the nervous system are to be regarded as of the nature of a hypocalcæmia, and tetany its chief manifestation. Now a large number of cases of so-called milk-fever pass through the attack without showing any tetany or spasticity of the limbs whatever and, judging from the current issue of the *Veterinary Record*, the safest and best method of treatment is still the older one of inflation, wherein there is no actual addition of calcium to the body-tissues generally. But this in passing, since I am in quest of information.

In former days much milk was produced in London itself, a very large number of cows being kept there (there were cows in King Street, Camden Town in 1884), but gradually more and more milk was brought from outside. I believe the Vale of Aylesbury was one of the first areas to send milk in quantity into London. Many years ago I saw in a journal of which I have lost all trace, an allusion to certain difficulties experienced by the Aylesbury cow-keepers in regard to the falling off in milk production by their cows and the occurrence of certain diseases amongst the latter, and further, that it was found that the excessive production of milk had deprived the land of its minerals, notably lime, and phosphates. The extended use of lime and bone appears to have been successful. I am wondering if there are any records in the literature dealing with the diseases which were met with in the Vale of Aylesbury at that time.

I am,
Yours, etc.,

F. T. Harvey.

St. Columb.
June 25th, 1932.

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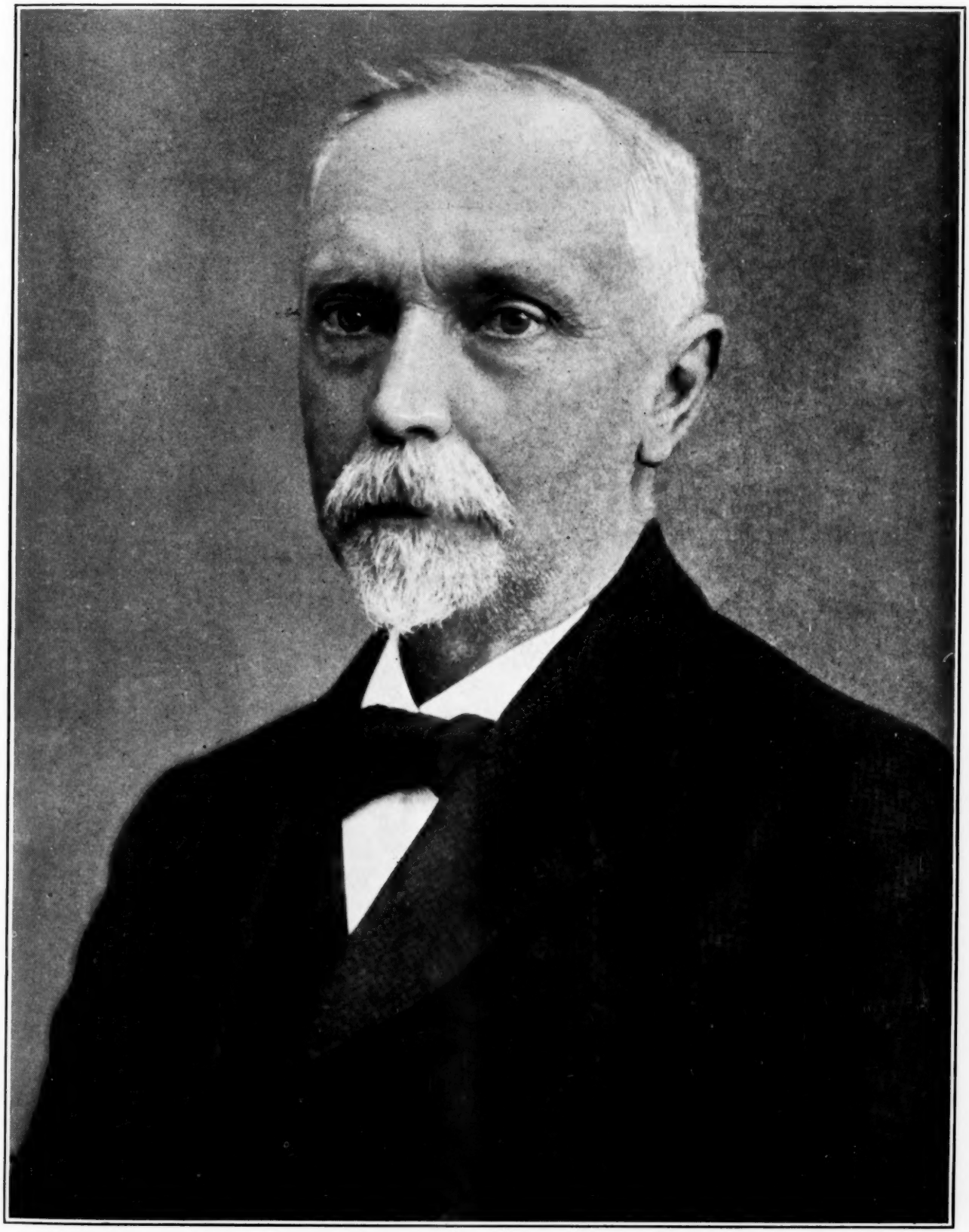
We regret that, owing to pressure on our space, a reply from Mr. J. F. D. Tutt, of Winchester, to Mr. J. T. Edwards' further letter on the subject of dental anæsthesia in the dog and a communication from Mr. C. R. Golledge, M.R.C.V.S., *of Trowbridge, on the Calcium Treatment of Milk Fever are unavoidably held over to our next issue.*



THE LATE DR. BERNARD BANG,
Veterinary Adviser to the Danish Government.
Born June 7th, 1848; Died June 22nd, 1932.